



**PLEASE CHECK FOR CHANGE INFORMATION  
AT THE REAR OF THIS MANUAL.**

# **TM 5006A**


## **Power Module**

**Tektronix, Inc.**  
**P.O. Box 500**  
**Beaverton, OR 97077**  
070-7614-03  
Product Group 75

Serial Number \_\_\_\_\_  
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### INSTRUMENT SERIAL NUMBERS

Each instrument manufactured by Tektronix has a serial number on a panel insert, tag, or stamped on the chassis. The letter at the beginning of the serial number designates the country of manufacture. The last five digits of the serial number are assigned sequentially and are unique to each instrument. Those manufactured in the United States have six unique digits. The country of manufacture is identified as follows:

B010000	Tektronix, Inc., Beaverton, Oregon, USA
J300000	Sony/Tektronix, Japan
H700000	Tektronix Holland, NV, Heerenveen, The Netherlands

Instruments manufactured for Tektronix by external vendors outside the United States are assigned a two-digit alpha code to identify the country of manufacture (e.g., JP for Japan, HK for Hong Kong, IL for Israel, etc.).

## SERVICE SAFETY SUMMARY

*FOR QUALIFIED SERVICE PERSONNEL ONLY*

*Refer also to the preceding Operator Safety Summary.*

### **Do Not Service Alone**

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

### **Use Care When Servicing With Power On**

Dangerous voltages may exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.

Disconnect power before removing protective panels, soldering, or replacing components.

### **Power Source**

This product is intended to operate from a power source that will not apply more than 250 volts rms between the supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.



# SPECIFICATION

## INTRODUCTION

The TEKTRONIX TM 5006A Power Module is a six-compartment mainframe for the TM 500 and TM 5000-Series of modular instrumentation. It accepts up to six independently functional plug-in modules to form a compact, versatile and low cost instrumentation system. The TM 5006A is a basic power source for plug-in modules of the TM 500/TM 5000 Series family. It provides unregulated dc and ac supplies and nondedicated power transistors for plug-in usage.

## Options

Refer to the Options section of this manual for information on instrument options.

## Performance Conditions

The values listed below are valid only when the instrument is operated at an ambient temperature between 0° C and +50° C.

## Accessories

Refer to the accessories list in the Replaceable Mechanical Parts list at the rear of this manual for part numbers.

### Standard Accessories

- 1 — Instruction Manual
- 1 — Power Cord (US)

### Optional Accessories

- 6 — Plug-in retainers
- 6 — Screws, 8-32 X 0.875
- 1 — Screwdriver bit, special

## ELECTRICAL CHARACTERISTICS

Table 1-1  
Voltage Supplies

Characteristics	Performance Requirements	Supplemental Information
<b>+25 V dc</b>		
Tolerance <sup>a</sup>	+23.1 V to +29.9 V	
PARD <sup>b</sup> (Periodic and Random Deviation)		≤2.5 V pk-to-pk
Maximum Load		1 ampere per compartment
Maximum Load di/dt		10 mA/μs
<b>-25 V dc</b>		
Tolerance <sup>a</sup>	-23.1 V to -29.9 V	
PARD <sup>b</sup>		≤2.5 V pk-to-pk
Maximum Load		1 ampere per compartment
Maximum Load di/dt		10 mA/μs
<b>+8.2 V dc</b>		
Tolerance <sup>a</sup>	+7.6 V to +8.5 V	
PARD <sup>b</sup>		≤600 mV pk-to-pk
Maximum Load		
Standard Compartment	3 amperes per compartment	
High Power Compartment	3 amperes per compartment	
Maximum Load di/dt		20 mA/μs
<b>25 V ac (2 each compartment)</b>		
Range		25.0 V rms +10%, -15% floating
Maximum Load		
Standard compartment		1 ampere rms per winding
High Power Compartment		2.5 ampere per winding
Maximum Floating Voltage		350 V peak from chassis ground
<b>17.5 V ac</b>		
Range		20.5 V rms +10%, -20% with grounded center tap
Maximum Load		350 mA per compartment
<b>MAXIMUM PLUG-IN POWER DRAWN FROM MAINFRAME<sup>b</sup></b>		
Standard Compartment		30 W dc or 50 VA ac <sup>c</sup>
High Power Compartment		30 W dc or 125 VA ac <sup>c</sup>

<sup>a</sup>Worst case; low line with full load and high line with no load. These limits include PARD.<sup>b</sup>Periodic and Random Deviation. See National Electrical Manufacturers Association (NEMA) Standards Publication PY1-1972.<sup>c</sup>Combined power draw sharing limits

**Table 1-2**  
**Total Power Draw From Mainframe**

Characteristics	Performance Requirements	Supplemental Information
COMBINED POWER DRAWN SHARING LIMITATION <sup>d</sup>		
Standard Compartment		$VA_{ac} + 2.67 \text{ (watts } dc) \leq 100$
High Power Compartment		$VA_{ac} + 2.67 \text{ (watts } dc) \leq 150$
Combined Total All Compartments Sharing Limitation		$VA_{ac} + 2.67 \text{ (watts } dc) \leq 540$

<sup>d</sup>At nominal line voltage.

**Table 1-3**  
**Series Pass Transistors**

Characteristics	Performance Requirements	Supplemental Information
TYPE		One each NPN or PNP
MAXIMUM DISSIPATION		
Standard Compartment		10 W each, 20 W total
High Power compartment		30 W each, 50 W total
MAXIMUM FLOATING VOLTAGE		350 V peak

**Table 1-4**  
**Source Power Requirements**

Characteristics	Performance Requirements	Supplemental Information
VOLTAGE RANGES		Selectable 100 V, 120 V, 220 V, and 240 V nominal line $\pm 10\%$ (250 V maximum on 240 V range)
LINE FREQUENCY		48 Hz to 66 Hz
MAXIMUM POWER CONSUMPTION		Approximately 650 W
FUSE DATA		
100 V, 120 V Ranges		6 A, 3 AG fast blow
200 V, 240 V Ranges		4 A, 3 AG fast blow

**Table 1-5  
Miscellaneous**

Characteristics	Performance Requirements	Supplemental Requirements
MAXIMUM RECOMMENDED PLUG-IN POWER DISSIPATION		
One Wide		15 watts
Two wide		35 watts

## PHYSICAL CHARACTERISTICS

**Table 1-6  
Environmental<sup>b</sup>**

Characteristics	Supplemental Information
TEMPERATURE	Meets MIL-T-28800D, class 5.
Operating <sup>a</sup>	0° C to +50° C
Nonoperating	-55° C to +75° C
HUMIDITY	45-95% RH for 5 days cycled to +50° C. Exceeds MIL-T-28800D, class 5.
ALTITUDE	Exceeds MIL-T-28800D, class 5.
Operating <sup>a</sup>	4.6 km (15,000 ft)
Nonoperating	15 km (50,000 ft)
VIBRATION <sup>c</sup>	0.38 mm (0.015"), 5 Hz to 55 Hz, 75 minutes. Exceeds MIL-T-28800D, class 5.
SHOCK <sup>c</sup>	30 g's (1/2 sine), 11 ms, 18 shocks. Meets MIL-T-28800D, class 5.
BENCH HANDLING <sup>c</sup>	45°, 4", or equilibrium, whichever occurs first. Meets MIL-T-28800D, class 5.
TRANSPORTATION <sup>d</sup>	Qualified under National Safe Transit Association Preshipment Test Procedures 1A-B-1 and 1A-B-2.
EMC	Electro-mechanical compatibility within limits of F.C.C. Regulations, Part 15, Subpart J, Class A.

<sup>a</sup>With plug-ins. Some plug-ins require additional limitations.

<sup>b</sup>System environmental specification subject to individual plug-in specifications.

<sup>c</sup>With mechanical load of 19 lbs. ±1 lb. evenly distributed. Three two-wide plug-ins, each weighing 6 1/3 lbs. ±1/3 lb. with two rear support pins and one rear interface ECB. Requires retainer clips.

<sup>d</sup>Without mechanical load (plug-ins).



Table 1-7  
Mechanical

Characteristics	Supplemental Information
NOMINAL WEIGHT (without plug-in)	32.0 lbs (14.5 kg)
OVERALL DIMENSIONS	
Height	193.8 mm (7.63 inches)
Width	444.73 mm (17.509 inches)
Length	476 mm (18.74 inches)



# OPERATING INSTRUCTIONS

## PREPARATION

This section of the manual contains instructions on preparing the power module for use, and installing plug-in modules.



### Power Source

The TM 5006A is designed to operate from a power source with its neutral at or near earth (ground) potential with a separate safety-earth conductor. It is not intended for operation from two phases of a multi-phase system.

A power cord with appropriate plug configuration is supplied with each power module. If you require a power cord other than the one supplied, refer to Table 2-1, Power-Cord and Plug Identification.

### Power Usage/Loading Considerations

The TM 5006A may require up to 540 watts at the upper limits of high line voltage ranges. Actual power consumption depends on the particular plug-in combination and operating modes selected at any one time.

The power capability of the TM 5006A can best be used by carefully planning the plug-in configuration, the external loads, and the resulting power distributions. Optimum conditions may be obtained by:

1. Having equal loads in all compartments.
2. Dissipating as much power as possible in the external loads.
3. Operating the system in an ambient temperature near +25° C.

Each plug-in is provided access to a pair of heat-sinked, series-pass transistors, one NPN and the other PNP. These transistors enable the plug-in to operate in power ranges not possible if the power were to be dissipated within the plug-ins.

### Fuse Replacement

To check or replace a fuse, perform the following:

1. Set the power switch to off, and disconnect the power cord from the instrument.
2. See Figure 2-1. To check or replace the main power fuse, press downward on the tab located on the Line Voltage Selector just above the power cord receptacle.

The door will open, and the fuse can be inspected or replaced.

3. Close the door to reconnect the fuse.

### Line Voltage Selection

The line voltage selector is part of the line cord plug assembly, located on the rear of the power module. Verify that the voltage shown in the selector window is correct for the line voltage available.

If the displayed voltage selection is incorrect or the fuse needs replacement, perform the following procedure. Refer to Figure 2-1. (The voltage is indicated by the red-marked window.)


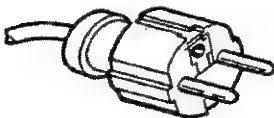
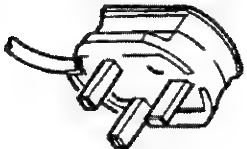


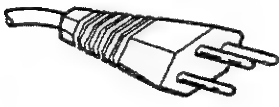
1. Assure that the power module power switch is turned off and the line cord is not plugged into the line voltage connector.
2. See Figure 2-1. Press downward on the tab located on the Line Voltage Selector just above the power cord receptacle. This opens the selector door.
3. Using a small screwdriver, gently pry, first on one edge, then the other, to remove the line selector card. This etched circuit card is approximately 3/4" square and 1/8" thick.
4. Note that on each edge of the selector card there is a red mark, but that the mark is in a different position on the edge.
5. Orient the selector card for the desired range, and press the card into its receptacle.
6. Ensure that the installed fuse matches the range selected.
7. Close the selector door. The proper range should show through the correct window.
8. Reconnect the power cord. The TM 5006A is ready for use.

### Operating Temperatures

The TM 5006A can be operated in an ambient air temperature of 0° C to +50° C.

Since the TM 5006A can be stored in temperatures between -55° C and +75° C, allow the instrument's chassis to return to within the operating limits before applying power.

**Table 2-1**  
**Power cord and Plug Identification**

Plug Configuration	Usage (Nominal Voltage/Max Current)	Reference Standards & Certification	Option Number
	North American 120 V/6A	ANSI <sup>1</sup> C73.11 NEMA <sup>2</sup> 5-15-P IEC <sup>3</sup> 83 UL <sup>10</sup> CSA <sup>11</sup>	Standard
	European 220 V/6A	CEE <sup>4</sup> (7), II, IV, VII IEC <sup>3</sup> 83 VDE <sup>8</sup> SEMKO <sup>9</sup>	A1
	United Kingdom 240 V/6A	BSI <sup>5</sup> 1363 IEC <sup>3</sup> 83	A2
	Australian 240 V/6A	AS <sup>6</sup> C112 ETSA <sup>12</sup>	A3
	North American 250 V/10A	ANSI <sup>1</sup> C73.20 NEMA <sup>2</sup> 6-15-P IEC <sup>3</sup> 83 UL <sup>10</sup> CSA <sup>11</sup>	A4
	Switzerland 220 V/6A,	SEV <sup>7</sup>	A5

<sup>1</sup> ANSI—American National Standards Institute<sup>2</sup> NEMA—National Electrical Manufacturer's Association<sup>3</sup> IEC—International Electrotechnical Commission<sup>4</sup> CEE—International Commission on Rules for the Approval of Electrical Equipment<sup>5</sup> BSI—British Standards Institute<sup>6</sup> AS—Standards Association of Australia<sup>7</sup> SEV—Schweizerischer Elektrotechnischer Verein<sup>8</sup> VDE—Verband Deutscher Elektrotechniker<sup>9</sup> SEMKO—Swedish Institute for Testing and Approval of Electrical Equipment<sup>10</sup> UL—Underwriters Laboratories<sup>11</sup> CSA—Canadian Standards Association<sup>12</sup> ETSA—Electricity Trust of South Australia

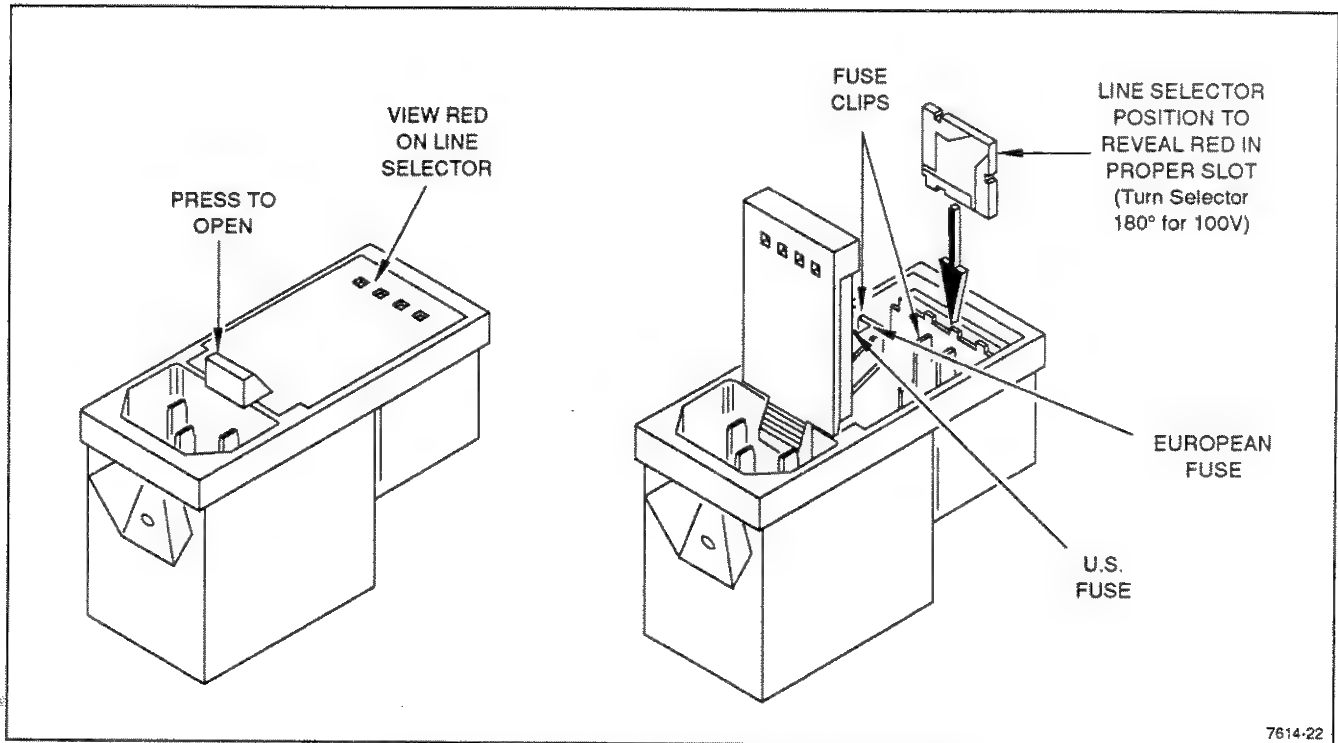


Fig. 2-1. Line voltage selection and main fuse replacement.

**CAUTION**

*To assure proper cooling of all plug-in modules installed, the unused plug-in compartments must be covered with a blank plug-in.*

**Family Compatibility**

Mechanically, the TM 5000 plug-in modules are very similar to other Tektronix product families. However, they are not electrically compatible. Therefore, the TM 5006A interface has barriers on the mating connectors between pins 6 and 7 to ensure that incompatible modules cannot be inserted. Refer to Figure 2-11 at the end of this section. A compatible module will have a matching slot between pins 6 and 7 of its main circuit board edge connector. This slot and barrier combination is the primary keying assignment.

**Customizing the Interface**

The modularity of this instrumentation system provides for many different functions to be performed by the plug-in modules. Specific functions are grouped into families or classes, of which there may be several plug-in module members. For instance, some classes are Power Supplies, Signal Sources, Measurement, and so forth. Each modular member of a functional family will have a second slot, peculiar to its family assignment, located in its edge connector. The TM 5006A user can select one or more com-

partments to accept only members of that family, by installing a second barrier in the interface connector to match the modules slot location. An entire TM 5006A can be set up in this manner for specific work functions. For extra barriers, refer to the Replaceable Mechanical Parts list at the rear of this manual.

**Cabling****CAUTION**

*Remove power cord before attempting cable installation.*

For convenience, cabling from the front of the power module to the rear panel may be run through the air intake and cable raceway as shown in Fig. 2-3. To install this cabling first remove the access panel on the rear of the power module. See Fig. 2-2. Next remove the two bottom panel retainer screws and the bottom panel retainers. Slide the bottom panel out from the rear of the instrument. Pass the cable through the front air intake, across the bottom of the plug-in support rails and out the access panel. Replace the power module bottom cover.

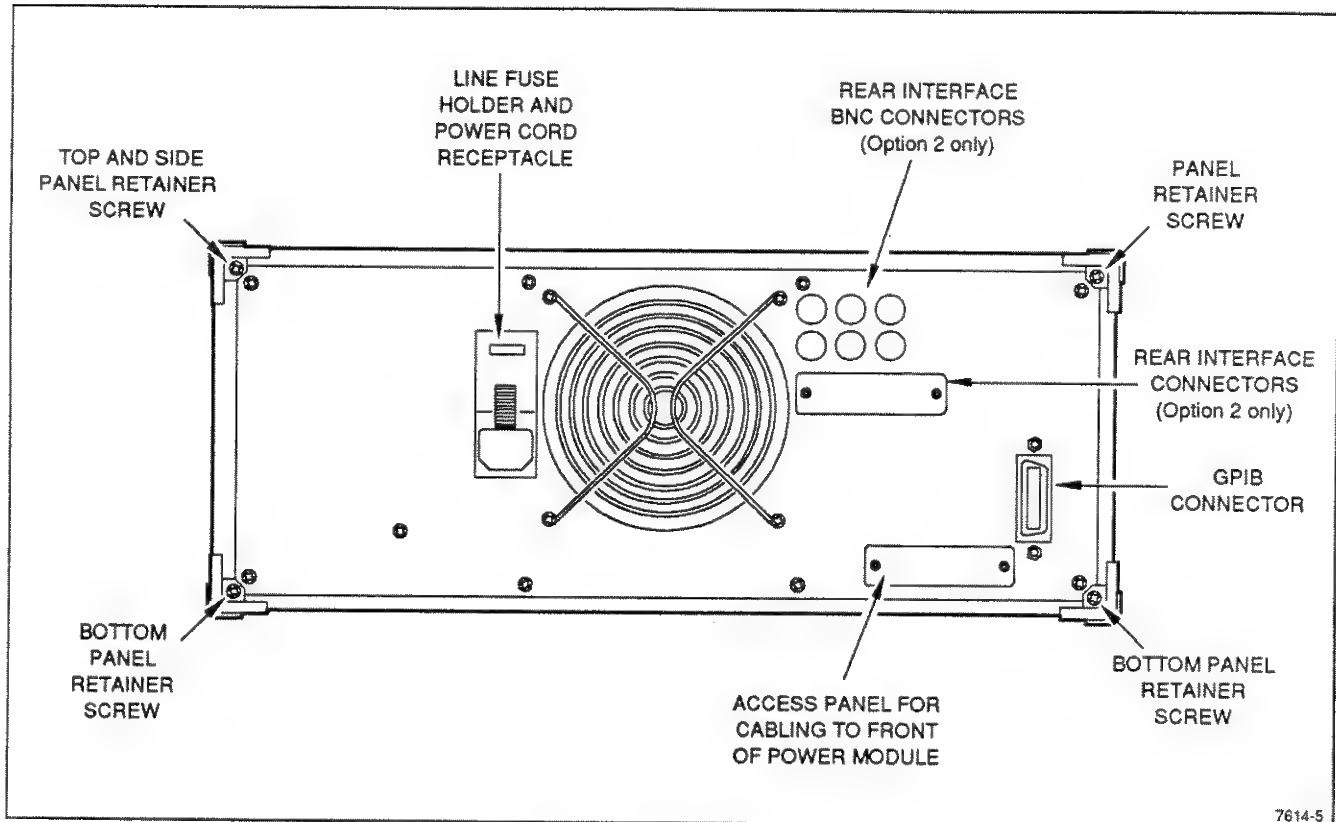


Fig. 2-2. TM 5006A rear panel.

**CAUTION**

*To ensure proper cooling, do not operate the power module with any cover removed.*

**Table Top Use**

The power module may be operated with the front raised. To raise the front of the instrument extend the front bail.

**Rear Panel**

The rear panel has a connector mounting plate for bnc and multi-pin connector mountings. Customer-installed connectors and wiring (Option 02) can provide external access to the interface. This feature makes the TM 5000-Series Modular Instrumentation System very flexible in bench-top or rackmounted systems.

**Rackmounting Instructions**

**Cooling.** Examine the side panels of the TM 5006A, Option 10, power module. If there are no cooling holes in the side panels, at least 1-inch clearance must be maintained between the bottom of the power module and the

instrument below it. This is necessary to insure proper cooling. If the side panels have cooling holes, no special precautions are necessary.

If the rack has positive internal pressure for cooling purposes, the mainframes must have all compartments filled with plug-ins or blank front panels (available from Tektronix, Inc.) must be installed in the unused plug-in openings. If greater internal air flow is desired in a relatively highly pressurized rack, the grill opening at the bottom front of the TM 5006A may also be blocked.

**Rack Dimensions.** The TM 5006A, Option 10, is shipped from the factory ready for rack mounting. Figure 2-4 shows major dimensions. Figure 2-5 shows the spring-latch cutout in the stationary section.

**NOTE**

*The slide tracks supplied with the TM 5006A Option 10, have holes in the stationary sections to accommodate the spring latches. The TM 5006A, Option 10 should not be mounted with rack slides that do not have the rack-latch holes.*

The TM 5006A, Option 10, fits the standard 19-inch side cabinet, rack or console. Spacing inside the front rails must be at least 17 3/4 inches. This allows clearance for the

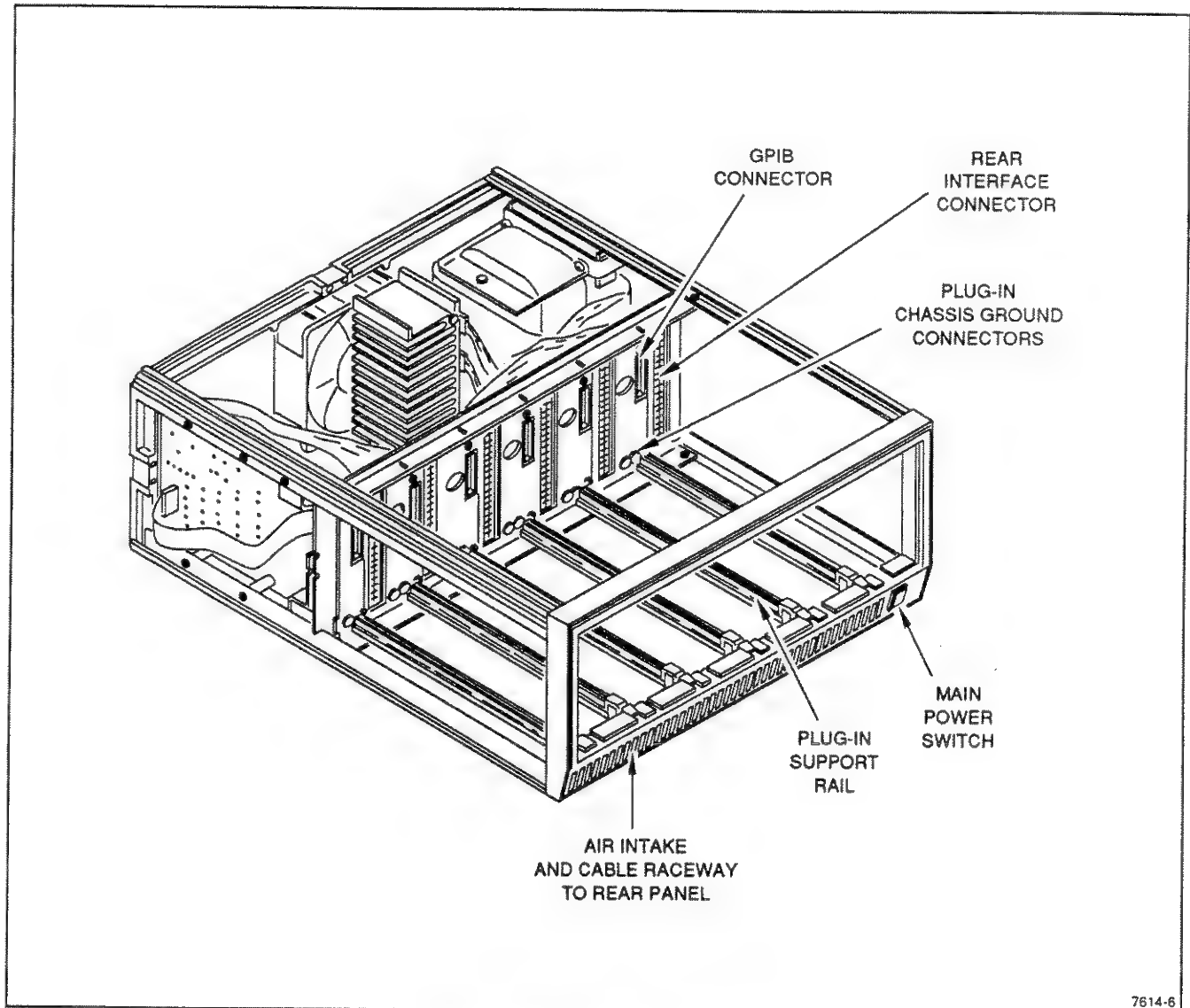


Fig. 2-3. TM 5006A front diagonal view.

stationary section of the slide-out tracks to permit the assembly to slide freely on the slid-out tracks.

The slide-out tracks, with existing hardware supplied, will conveniently mount in any rack with the front and rear rails spaced from 10 1/2 inches to 24 1/2 inches.

**Mounting the Slide Tracks.** Locate the proper rack holes for mounting as shown in Figure 2-6. Notice that the hole spacing in the racks varies. When installing the slides in the EIA type racks, make certain the slides are attached to the 1/2-inch spaced holes. Figure 2-6 also shows details for determining position of the slides in the rack. Mount the rails using enclosed hardware as shown in Figures 2-7 and 2-8. Figures 2-8B and C show rail-mounting details for deep and shallow racks. Make sure the stationary sections

are horizontally aligned so they are level and parallel with each other.

### **WARNING**

*During rackmount installation, interchanging the left and right slide-out track assemblies defeats the extension stop (safety latch) feature of the tracks. Equipment could, when extended, come out of the slides and fall from the rack, possibly causing personal and equipment damage.*

*When mounting the supplied slide-out tracks, inspect both assemblies to find the LH (left hand) and RH (right hand) designations to determine correct*

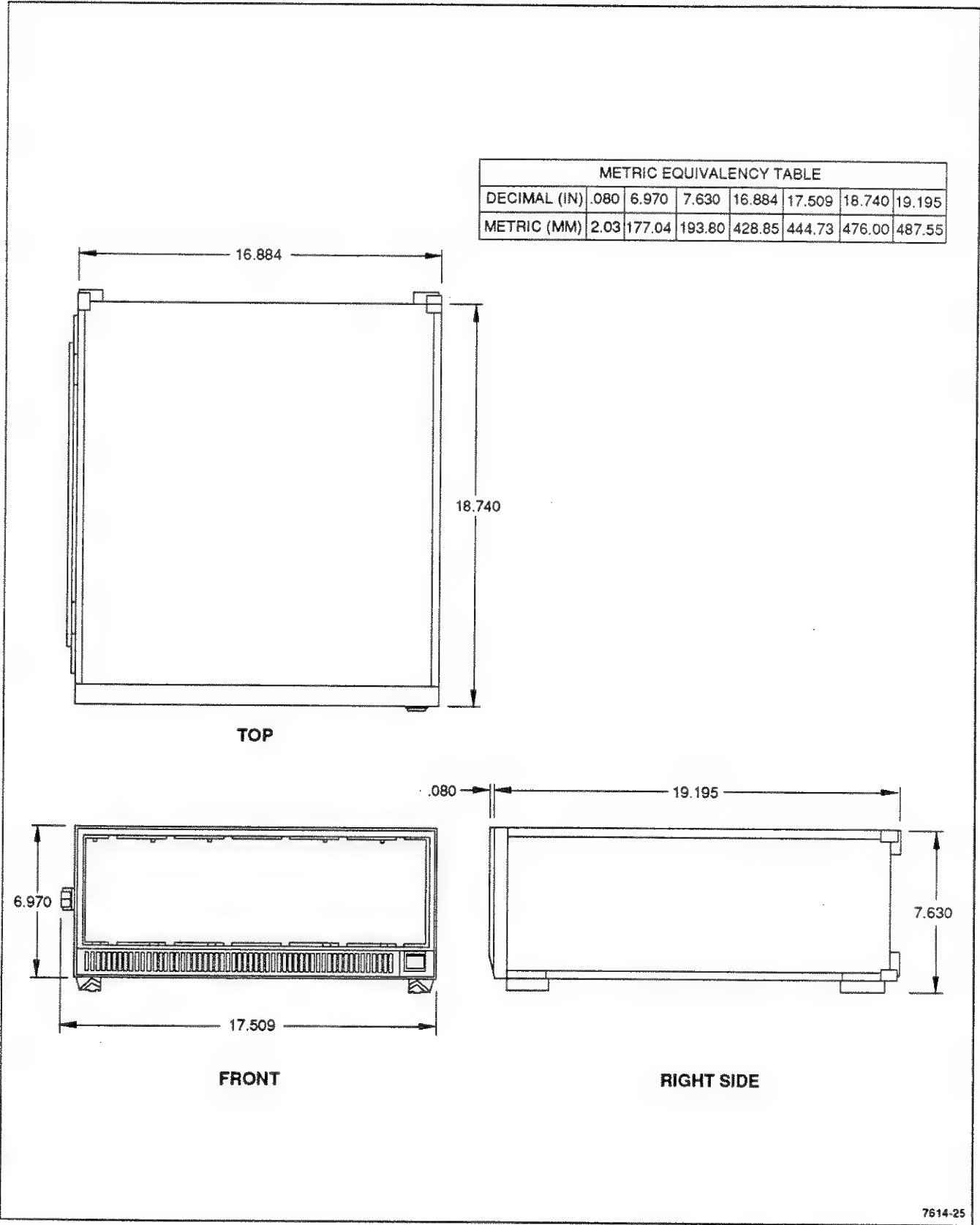


Fig. 2-4. TM 5006A overall dimensions.



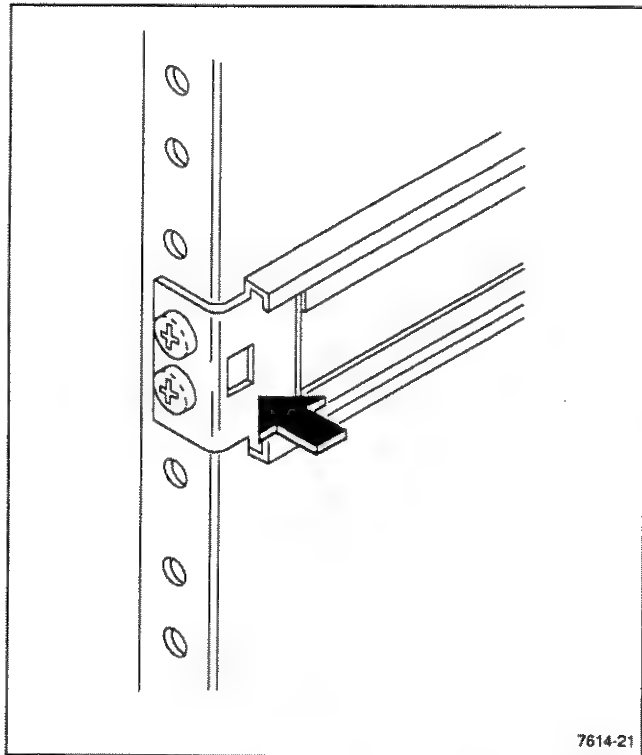


Fig. 2-5. Rack latch hole.

placement. Install the LH assembly to your left side as you face the front of the rack and install the RH assembly to your right side. Refer to the rackmounting instructions in this manual for complete information.

**Installing the TM 5006A, Option 10, in the Rack Slides.** Make certain all plug-ins are removed from the power module. Pull the slide-out track intermediate sections out as far as they will go. See Figure 2-9. Insert the instrument chassis sections into the intermediate section and push the instrument forward until the instrument chassis section locks into the intermediate section. Now press both buttons protruding from the stop-latch holes in the intermediate sections while pushing the instrument. The instrument can now be pushed into the rack, cabinet, or console. The latches holding the intermediate sections to the stationary sections are automatically operated by the instrument as it is pushed into the rack or cabinet. The quick release latches automatically engage the rack-latch holes in the stationary sections of the rails as the instrument is pushed fully into the rack.

**Removing the Instrument.** Remove all plug-ins from power module. Unscrew the two thumb screws at the top of the front panel. Pull the rectangular latches on both sides of the front panel. Using the latches pull the instrument from the enclosure until the slide intermediate sections latch with the instrument sections and the stationary sections. The instrument is firmly held in this position. To completely remove the instrument, press both release-

latch buttons visible in the stop-latch holes and carefully slide the instrument from the rack or cabinet.

**Rack Adjustments.** After installing the instrument in the rack, binding in the rack slides may occur if the slides are not properly adjusted. Slide the instrument from the rack until the front panel is about 10 inches from the front of the rack. Slightly loosen the screws holding the right and left tracks to the front rails. Allow the tracks to seek their normal position. Retighten the screws and check the tracks for smooth operation by sliding the instrument in and out of the rack.

**Rack Slide Maintenance.** The slide-out racks do not require lubrication. The dark gray finish on the tracks is a permanent lubricative coating.

## MODULE INSTALLATION

### CAUTION

Turn the Power Module off before inserting plug-in modules; otherwise damage may occur to the plug-in circuitry.

### NOTE

The DC 505, DC 505A and LA501W plug-ins are not compatible with this power module.

1. Check the location of the black plastic barrier key on the TM 5006A interconnecting jack of the selected power module compartment to ensure that its location matches the slot in the edge of the plug-in module's circuit board. If it does not match, refer to qualified service personnel.

2. Align the plug-in module chassis with the upper and lower guides of the selected compartment (see Fig. 2-10). Push the module in and press firmly to seat the circuit board in the interconnecting jack. (Remove the plug-in module by pulling on the release latch in the lower left corner of the plug-in module.)

### Plug-In Retainer Clip Installation

The retainer clips, provided with the instrument, are used to ensure that an installed plug-in module cannot come out of the power module while it is being moved or transported. Note that plug-in modules cannot be removed or inserted with the retainer clips installed.

To install the retainer clips, elevate the front of the power module with the bail. Install the retainer as shown in Figure 2-10. A T-20 Torx bit is required.

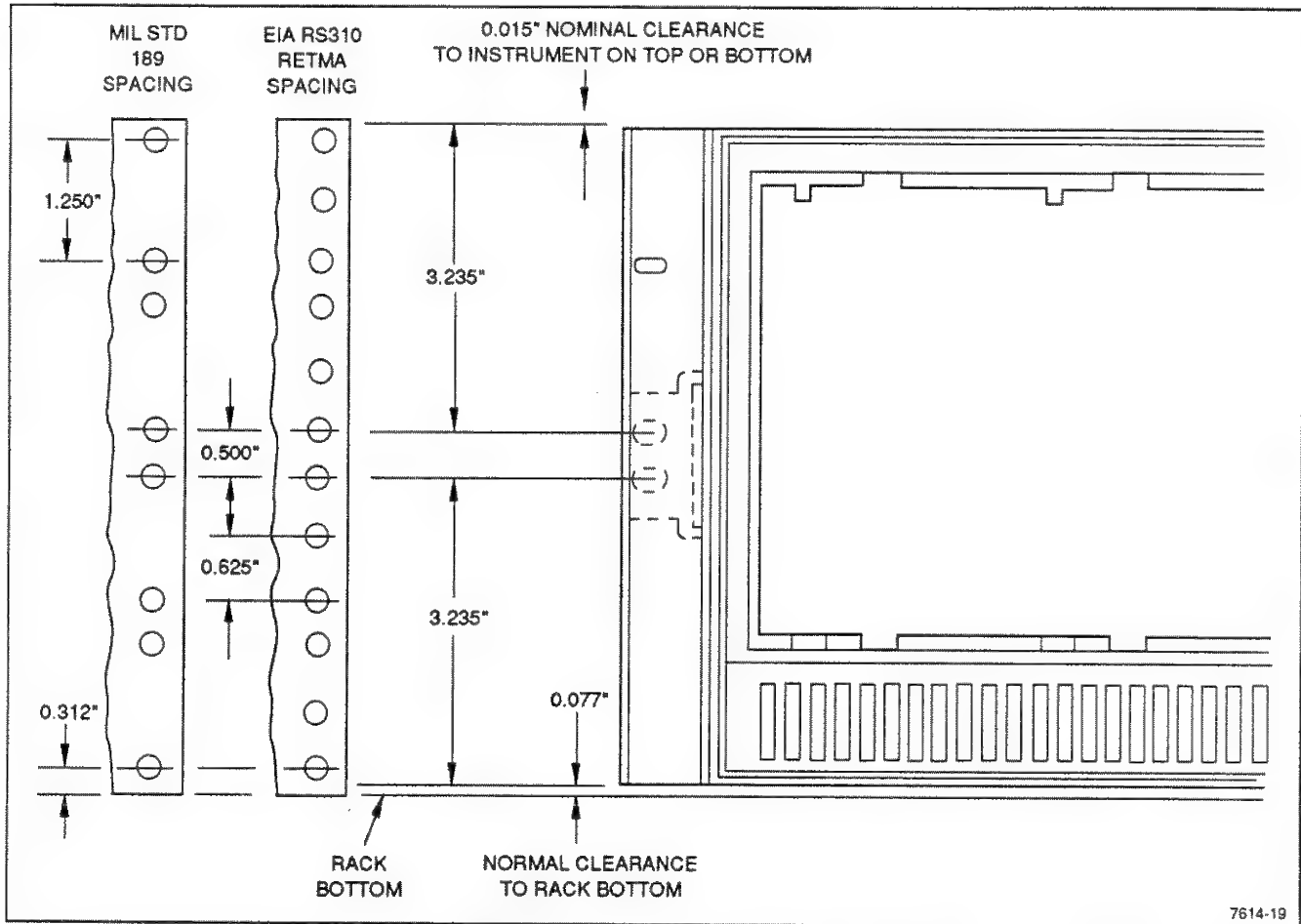


Fig. 2-6. Dimensions and positioning in standard rack.

### Turn-On Procedure

After completing the power module preparation and plug-in module installation instructions, install the power cord and connect to the proper power outlet. Turn on the power switch on the rear of the power module.

Some plug-ins have independent power switches, usually labeled OUTPUT, that control application of mainframe power to the plug-in.

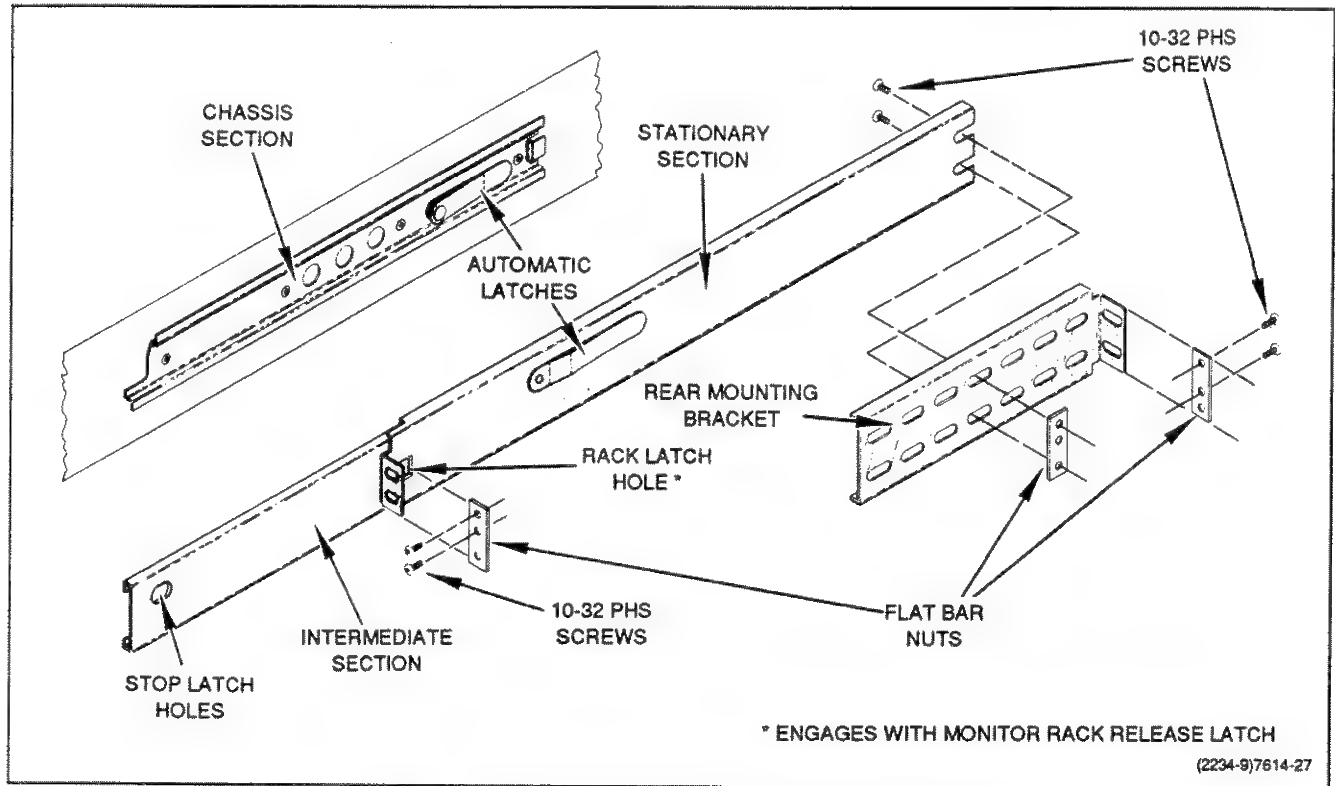


Fig. 2-7. Slide detail. Discard bar nuts if rack is tapped.

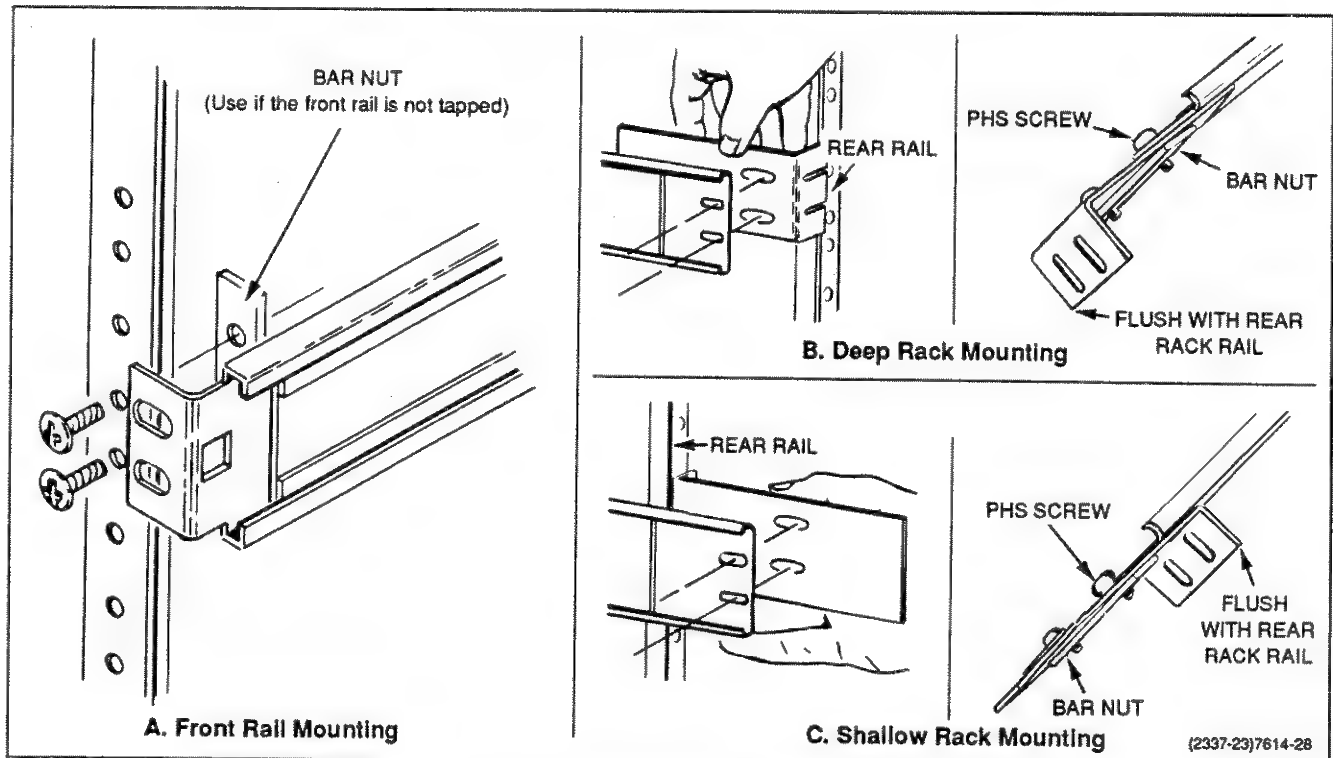


Fig. 2-8. Rackmounting slide details.

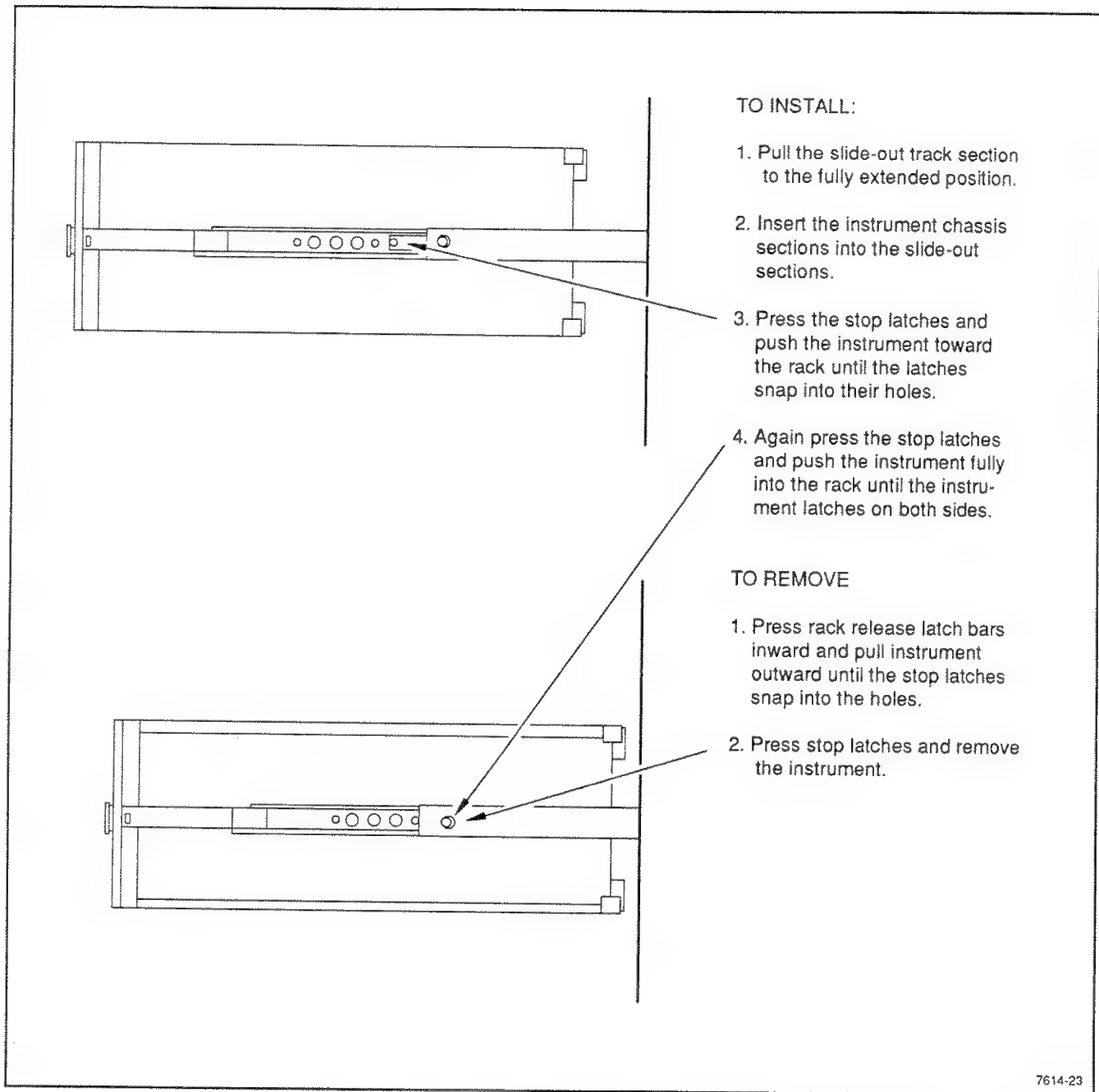


Fig. 2-9. Removing and installing TM 5006A in rack slides.

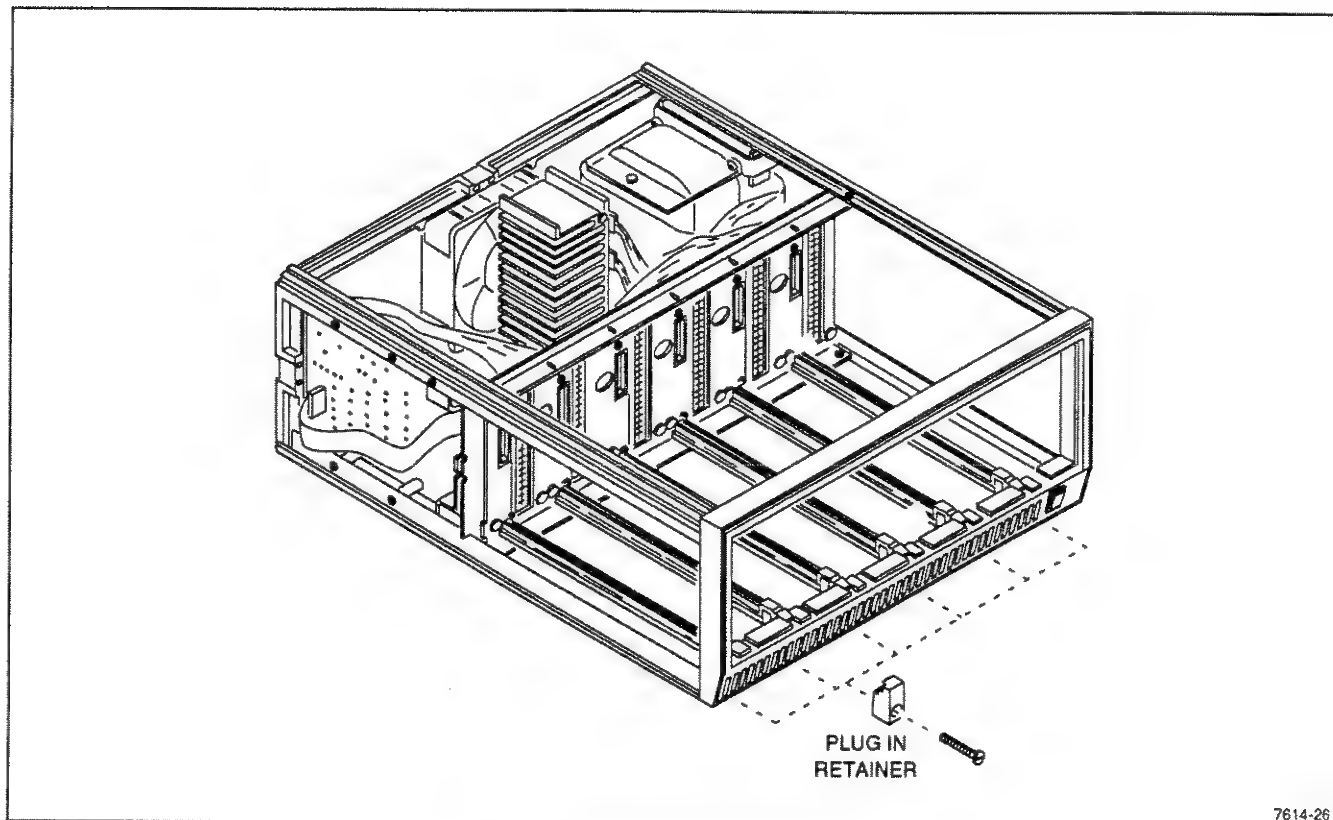


Fig. 2-10. Plug-in installation and removal.

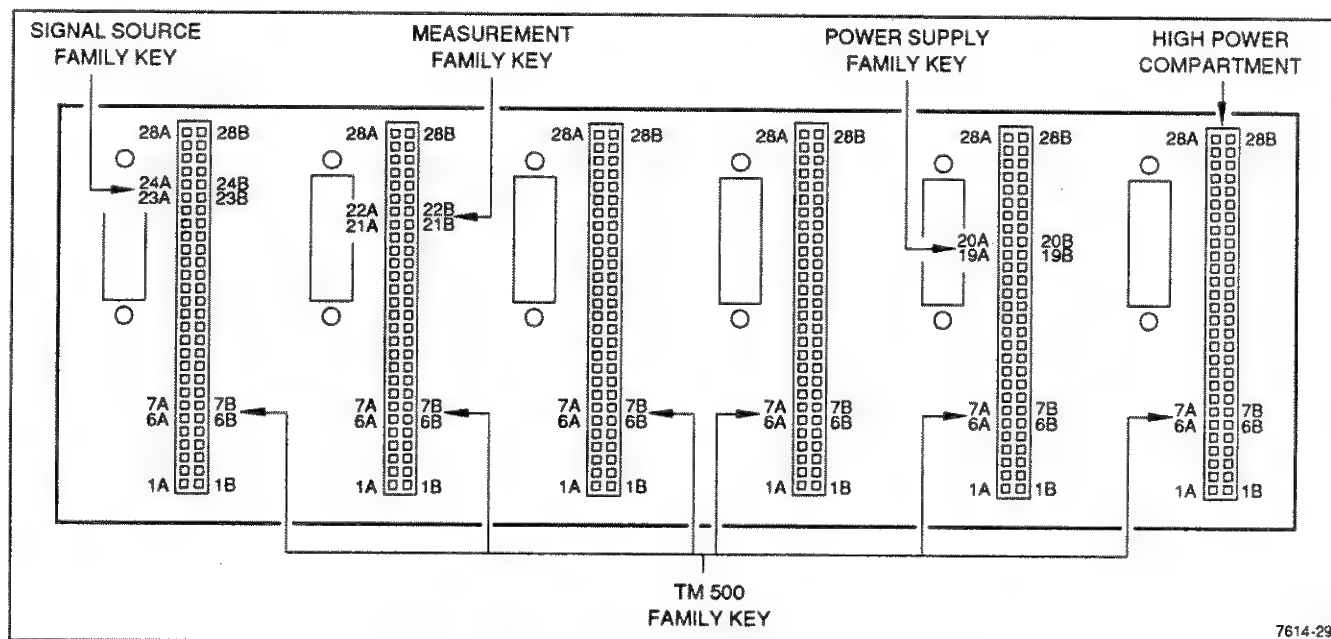


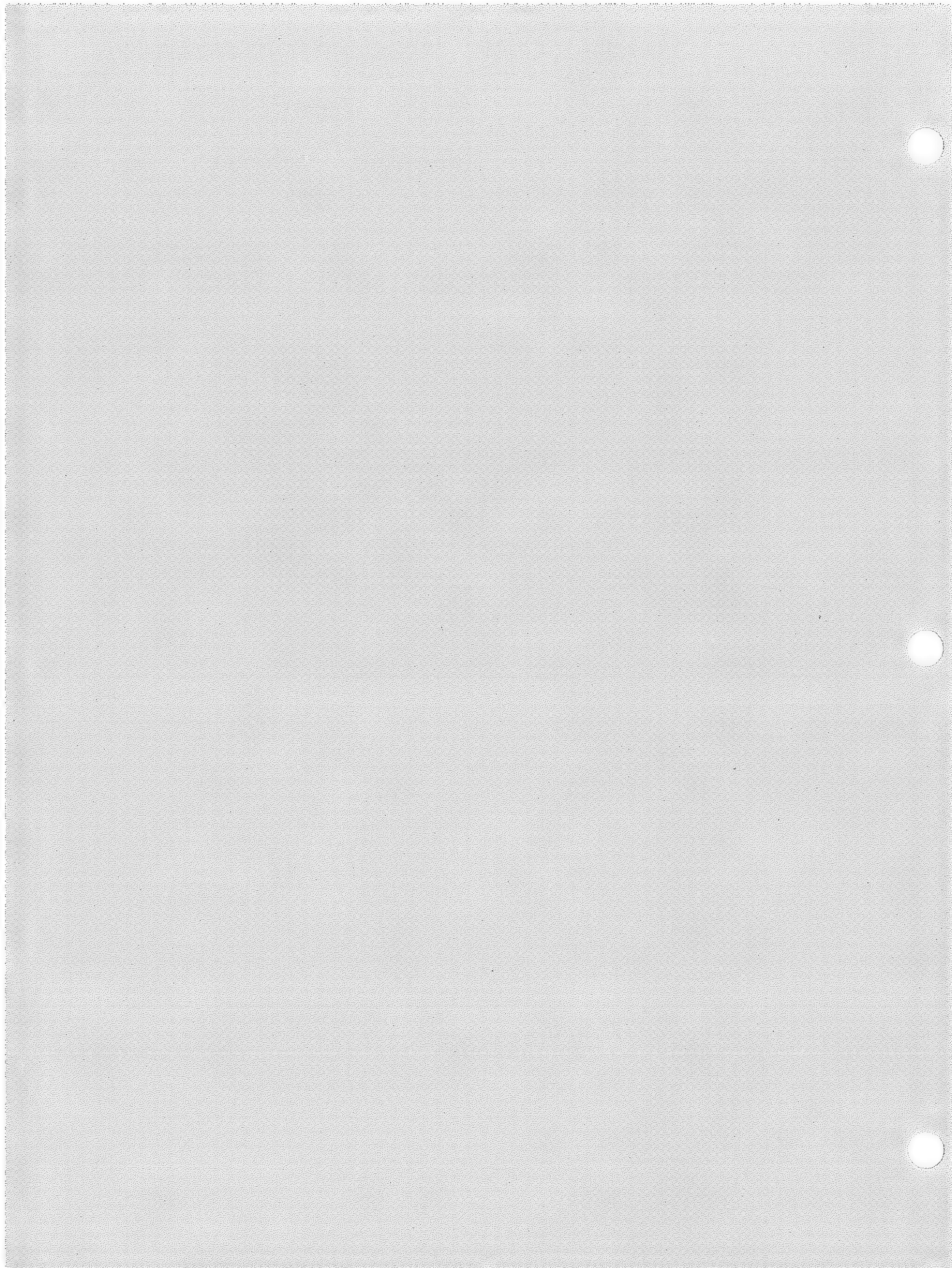
Fig. 2-11. One of many possible keys for family functions.



## **WARNING**

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO. REFER TO OPERATORS SAFETY SUMMARY AND SERVICE SAFETY SUMMARY PRIOR TO PERFORMING ANY SERVICE.







# THEORY OF OPERATION

## Introduction

For ease in understanding, this description refers to the schematics located in the pullout pages at the rear of this manual. Also refer to the block diagram located in the pullout pages and the timing diagram in Figure 3-1. Each block in the block diagram is outlined on the schematics.

The TM5006A uses a pulse width modulated switching supply for dc voltages. A 60 Hz transformer provides the ac voltages necessary for plug-in operation. Connections to the six plug-in compartments as well as the series pass transistors are shown on Diagram 3.

## Line Selector and 60 Hz Transformer (Diagram 4)

Ac power is applied to the voltage select terminals through FL500 and FL600.

The two primary windings on T500 are connected in parallel for 120 V operation or in series for 240 V operation. Winding taps are provided for 100 V and 220 V line voltages. The secondaries provide ac voltages to the various plug-in compartments and to the Regulator Power Supply.

## Rectifiers and Filters (Diagram 5)

The ac line voltage is applied through negative temperature coefficient resistances RT4010 and RT4011 to the rectifier diodes. As these resistances are highest when cold, the surge currents charging the high voltage capacitors when line voltage is applied, are limited, thus preventing component failure. These resistors then self heat to a low resistance.

In 220 V/240 V operation the four diodes function as a bridge rectifier (see Fig. 3-2). When the voltage-select circuit is set for 100 V/120 V operation, only the two series diodes operate. The circuit then becomes a voltage doubler with an output of approximately 350 V dc. The neon bulb (DS1052) in this circuit flashes to indicate when dc voltage is present.

The rectified and filtered dc is applied through low-pass filters L3051, L3050 and T4050, C4060, and passes through CR3085 to the drain of Q3087. RC networks C2054-C2052, R1051-R2040, and LR2053-LR2050 reduce the self resonance of L3051 and L3050.

## PWM Regulator (Diagram 3)

U2020 in the PWM (Pulse Width Modulation) Regulator provides all of the control and regulator functions for the output stage. U2020 contains a voltage ref-

erence, an error amplifier, clock circuit, logic, pulse width control and output drivers.

Minimum output dead time is fixed by the discharge time of C2010 and R3017 (approximately 5  $\mu$ S). Maximum output pulse width is set by C2010 and R1015 and R1010 variable, for frequency adjustment (about 20  $\mu$ S), to make up 1/2 cycle of the output drivers. The error amplifier controls the output pulse prior to maximum width when the supply is in regulation. The maximum pulse width is also proportional to the voltage (when  $\leq$  about 4 V) at U2020 pin 8 the soft start control. Soft start timing capacitor C3020 is charged to approximately 5V by a 50  $\mu$ A source in U2020 causing a slowly increasing output pulse width at turn on or after a fault occurs to limit initial surge currents.

The +8.2V output of the supply is divided down to about +5.1V and adjusted by R1011, R1022, R1040 and is compared to the +5.1V reference from U2020 pin 16 by the error amplifier in U2020, which controls its output pulse width.

Active hi and low outputs U2020 pin 11 and pin 14 are either both low (dead time) or opposite levels for pulse output. R1012 limits output current.

## Converter and Output Stage (Diagrams 5 & 3)

The output stage is a half bridge type with proportional gate drive. The turns ratio and phasing of T2080 provide approximately 10 volts of gate drive to either the Q3086 or Q3087 MOSFET depending on which output of U2020 is high. When both outputs of U2020 (diagram 3) are low the primary of T2080 is essentially shorted, reducing the gate drive to zero for both Q3086 and Q3087. Q3086 and Q3087 alternately conduct at a 20 kHz rate (their on and off times are controlled by U2020). Diodes CR3085 and CR3082 prevent drain gate current at turn off. A series resonant filter between the MOSFETs and the output transformer, T2050 (diagram 3) is composed of L2060 and C4071. During Q3086 and Q3087 off time, the tank current generated by L2060 and C4071 passes through CR3084 and CR3083. RC networks R4072, C4062 and R3070, C4070 and R5071, C5070 help reduce EMI. R2081, R2082 and R3080, R3081 reduce ringing due to gate drain capacitance.

The 20 kHz output voltage is stepped down to the correct levels by T2050.

Three sets of full-wave diode rectifiers are provided for each of the three dc voltage outputs. Schottky diodes are used in the +8.2 V supply for reduced forward volt-

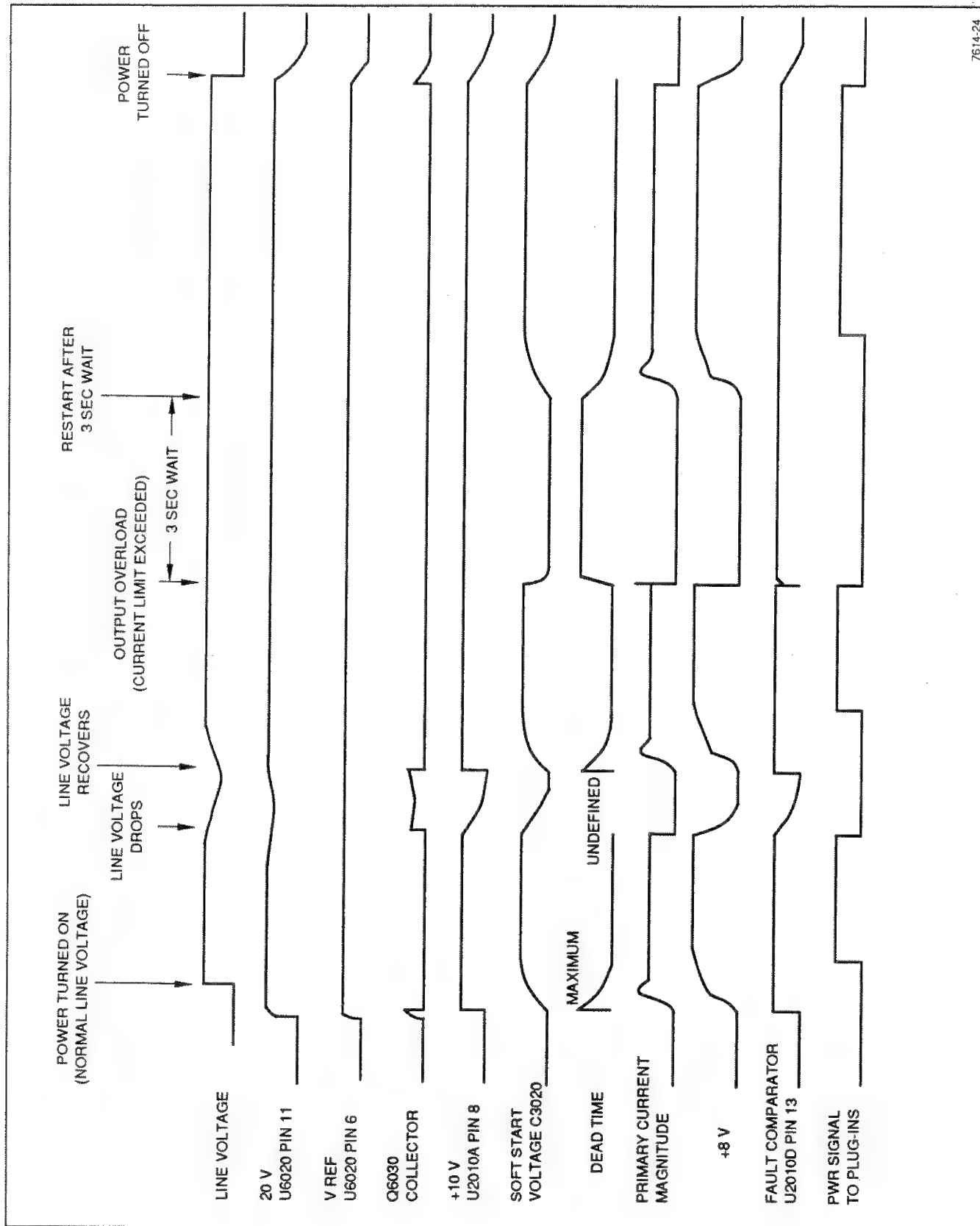


Fig. 3-1. Timing diagram for power on/off, fault, low line.

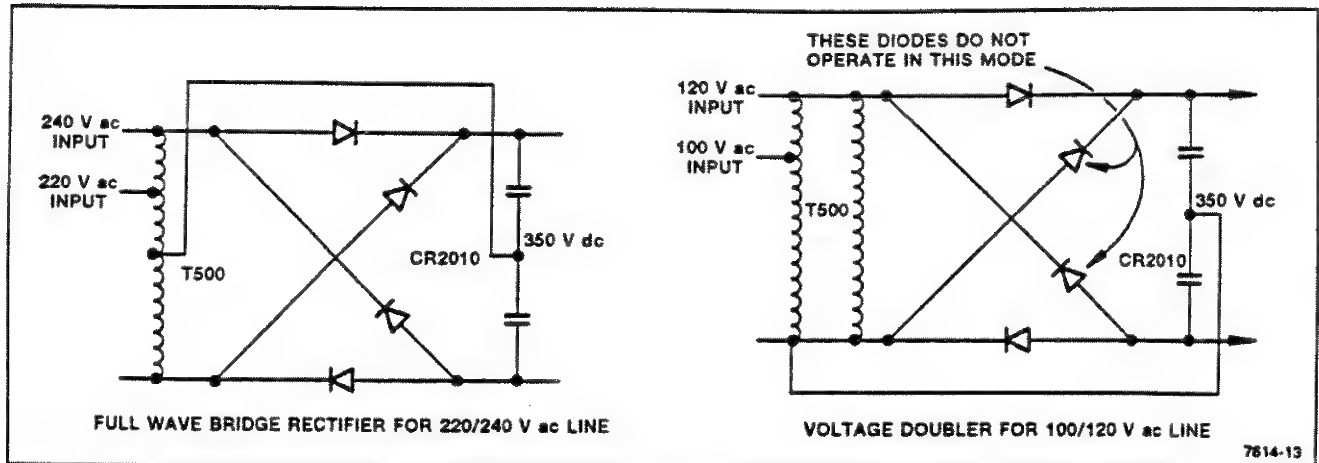


Fig. 3-2. Input line connections for 240 V and 120 V.

age drop. All filters are L-C pi-sections. Bleeder resistors are provided for all filter capacitors.

### Overvoltage and Overcurrent Protection (Diagram 3)

U2010B, C, D outputs are wire or'd and normally keep Q1020 saturated which keeps U2020 pin 10 (output shut down) low along with holding off Q1010 which allows C3020 to charge. When a fault is sensed U2010s or'd output goes low turning off Q1020, allowing U2010 pin 10 to go high turning off its output and discharging C3020 through Q1010. C3010 insures that Q1020 is off long enough to allow C3020 to be completely discharged.

Pin 11 of U2010, the negative over-voltage detector, connects to a voltage divider between the -25 V supply and the reference +7.15 V. Should pin 11 go more negative than pin 10, pin 13 goes low shutting off the output. The input of U2010D is protected from a negative voltage by CR2130.

Primary current in output transformer T2050 flows through T3060. The secondary voltage of T3060 is proportional to the primary current. The secondary voltage of T3060 is rectified by CR5040, CR5041, CR5042 and CR5043 and terminated in R5052. When the primary current in T3060 exceeds the point where the voltage at pin 6 of U2010B exceeds the 7.15 V reference at pin 7, pin 1 goes low turning off the output.

The +25 V is applied through R5031 and CR5034 to pin 8 of U2010C, the positive over-voltage detector. The +8.2 V is also applied through R5030 and CR5033 to pin 8. Pin 9 of comparator U2010C connects to the +7.15 V reference voltage. If pin 8 of U2010C goes more positive than pin 9, pin 14 goes low shutting off the output.

### Control Circuit Regulator (Diagram 3)

The 16 V ac winding on T500 is applied through F5010 to rectifier diode CR4020, which charges filter capacitor C5020 to approximately +20 V. The +20 V is applied to voltage regulator U6020. This regulator outputs two voltages: +10 V which is used throughout the entire supply, and +7.15 V, a reference voltage for the error sense circuit, at pin 6.

The line detector circuitry is composed of CR5030, C6030, Q6030 and associated components. When normal line voltage is applied, the voltage across C6030 is approximately 20 V. Transistor Q6030 is on and pin 2 of U6020 is about 0.2 V above ground. If about two cycles of line voltage is missed or the line voltage goes low, Q6030 no longer saturates. The collector of Q6030 rises, disabling the series pass transistor located internally in U6020. This series pass transistor is effectively connected between pins 11 and 10 of U6020. The +10 V is removed from the power supply during line drop out to prevent discharge of the main filter capacitors in the output stage. Positive feedback is provided through R4019 to the base of Q6030 to improve the switching action.

### Power Valid Control (Diagrams 2 & 3)

The PWR signal circuitry (U2010A and Q3005) provides a signal to each compartment in the power module to give power supply status information to the plug-ins. See the rear interface information part of the Maintenance section (Section 5) of this manual for timing information.

U2010A compares the output of U6020 pin 13 and the level of the soft start capacitor C3020 at U2010A pin 4 with the dc level of the voltage divider R4014 and R3012 (4.5 V) on U2010A pin 5. At instrument turn on or after a fault C3020 charges slowly to approximately 5 V. When it reaches 4.5 V the PWM regulator has full con-

## Theory of Operation—TM 5006A

trol of the TM5006A dc supplies and U2010A pin 2 goes low causing Q3005 (diagram 3) to saturate providing a high to each compartment indicating proper supply operation. When line loss or low line voltage occurs, U6020 pin 13 goes low causing the PWR signal to go low. The PWR signal will also go low if an error is detected and C3020 is discharged.

### Main Interface (Diagram 2)

The various ac and dc supply voltages as specified are available at the rear interface connectors for each plug-in compartment. Each compartment has a PNP and an NPN transistor intended as series pass elements. Connecting pins to these elements are shown on the diagram.

# CALIBRATION

## PERFORMANCE CHECK PROCEDURE

### Introduction

This procedure checks the Electrical Performance Requirements as listed in the Specification section in this manual. Perform the internal adjustment procedure if the instrument fails to meet these checks. If recalibration does not correct the discrepancy, circuit troubleshooting is indicated. Also, use this procedure to determine acceptability of performance in an incoming inspection facility.

Performance may be checked at any temperature between 0° and +50° C.

### Test Equipment Required

The test equipment listed in Table 4-1, or equivalent, is suggested to perform the performance check and adjustment procedures.

### **WARNING**

*Dangerous voltages are present inside this power module. Exercise caution as this procedure requires removal of the power supply cover.*

### Test Loads for the Performance Check

The power supplies in this module must be loaded before starting the performance check procedure. Maximum load for the +8.2 V supply is 18 A, and for the 25 V supplies 6 A. Maximum dissipation from these loads is 144 W and 156 W. The total power draw from any combination of the +8.2 V and  $\pm 25$  V supplies is 180 W or 30 W per compartment.

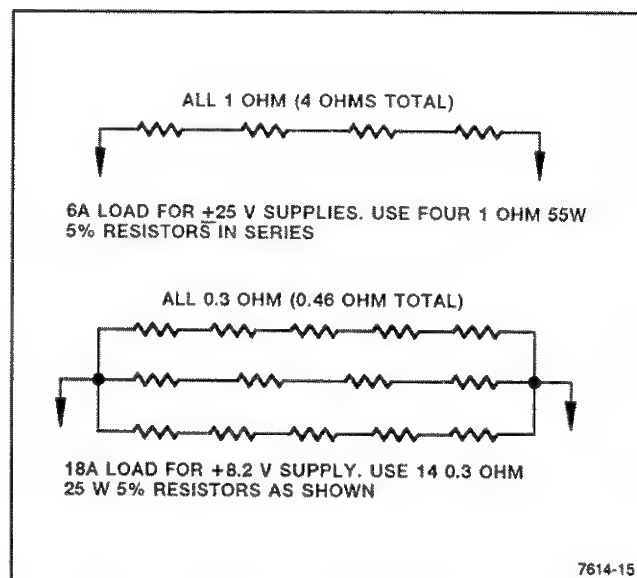


Fig. 4-1. Test loads for use with the performance check.

Figure 4-1 shows suggested loads. Any combination of resistors with sufficient dissipation is satisfactory. Connect the loads to the power module with not over 1.5 feet for each lead. Use 12 AWG for the 8.2 V load and 16 AWG for the 25 V loads. The ground lead should not exceed 1.5 feet of #12 AWG or larger.

## PERFORMANCE CHECK SUMMARY SHEET

This sheet may be duplicated and used as a short form performance check procedure. Perform the check and record the reading in the "Measured" column. Compare the reading with the upper and lower limits. After maintenance or adjustment again perform the procedure and compare the readings.

Date \_\_\_\_\_

Serial Number \_\_\_\_\_ Tested By \_\_\_\_\_

[illegible]

Table 4-1

Suggested Test Equipment

Description	Minimum Requirements	Performance Check Step	Adjustment Procedure Step	Recommended Equipment
Digital Multimeter	8.2 V, -25 V, +25 V	All	1	TEKTRONIX DM 504A Autoranging DMM
Test Loads		All		See Figs. 4-1 and 4-3
Variable Voltage Transformer	1000 VA capability	All	1	Variac W10MT3W Autotransformer, General Radio USA
Oscilloscope w/10X Voltage Probe	Vertical sensitivity 10 V, Horizontal sweep 20 $\mu$ s		2	TEKTRONIX SC 502 15 MHz Oscilloscope

**CAUTION**

*As considerable heat is generated in the test loads, do not apply power longer than necessary to complete tests.*

**Test Point Access**

Remove the top cover to gain access to the supply buses. Figure 4-2 shows the test point locations.

**1. Check +25 V dc**

- Connect the test equipment as shown in Figure 4-2. Set the Variable Voltage Transformer line voltage for 10% below the nominal line voltage. (Nominal line voltage is the line voltage the instrument is set to operate on.)
- Connect a 4  $\Omega$  test load and the DMM between the +25 V supply and ground terminals shown in Figure 4-2.
- CHECK—that the DMM reads from +23.1 V to +29.9 V.
- Change the line voltage to 10% above nominal.
- Remove the load from the supply.
- Set the +8.2 V load for maximum.
- CHECK—that the +25 V supply reads from +23.1 V to +29.9 V.

- Remove the connections to the +25 V bus for the next step.

**2. Check -25 V dc**

- Connect the test equipment as shown in Figure 4-2. Set the Variable Voltage Transformer line voltage for 10% below the nominal line voltage.
- Connect a 4  $\Omega$  test load and the DMM between the -25 V supply and ground terminals shown in Figure 4-2.
- CHECK—that the DMM reads from -23.1 V to -29.9 V.
- Change the line voltage to 10% above the nominal line voltage.
- Remove the -25 V, 4  $\Omega$  test load from the supply.
- Connect a 0.46  $\Omega$  test load and the DMM between the +8.2 V supply and ground terminals shown in Figure 4-2.
- CHECK—that the supply reads from -23.1 V to -29.9 V.
- Remove the connections from the -25 V bus for the next step.

**3. Check +8.2 V dc**

- Connect the test equipment as shown in Figure 4-2. Set the Variable Voltage Transformer line voltage for 10% below the nominal line voltage.

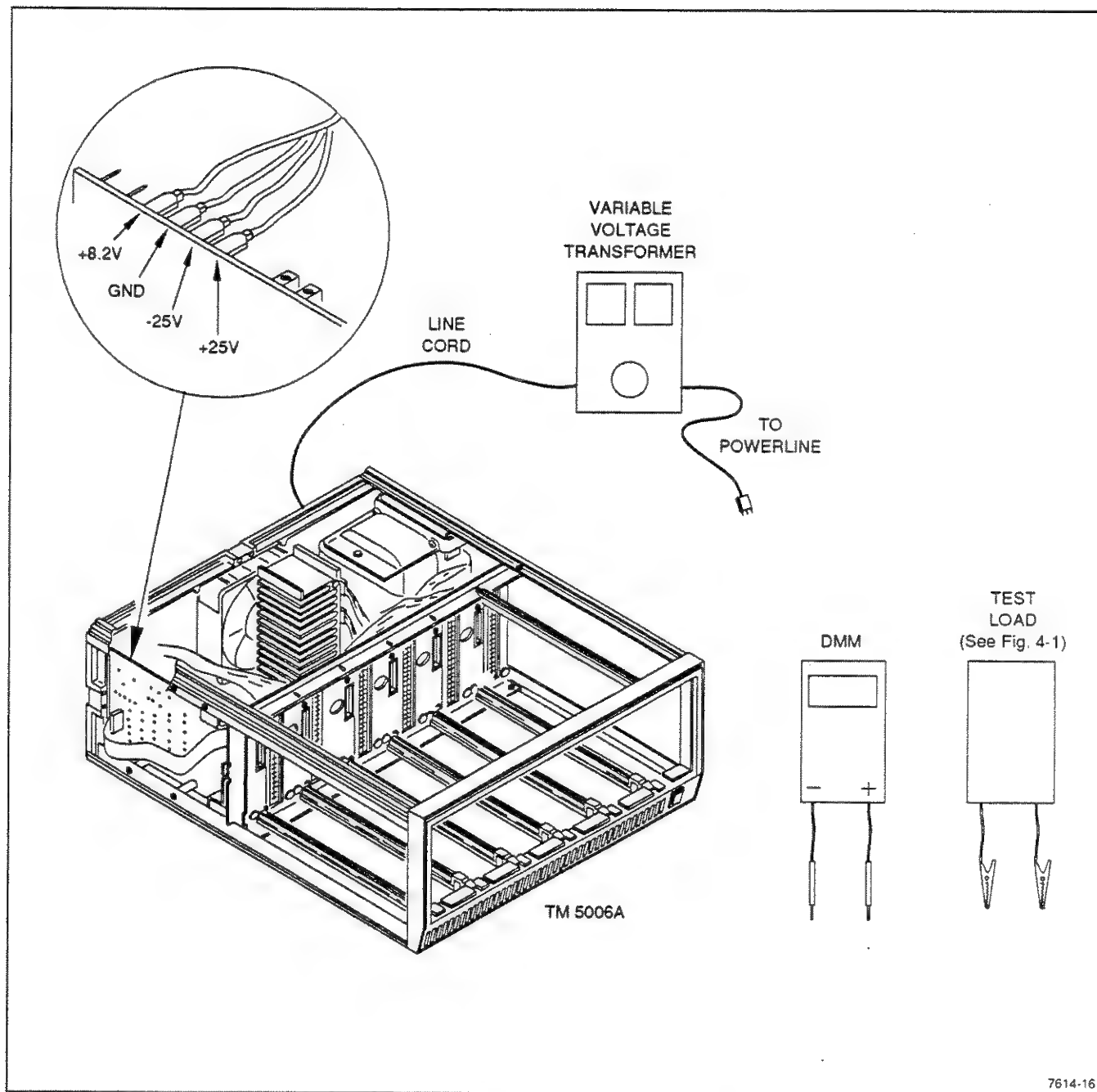


Fig. 4-2. Performance check setup.

- b. Connect a  $0.46\ \Omega$  test load and the DMM between the +8.2 V supply and ground terminals shown in Figure 4-2.
- c. CHECK—that the DMM reads from +7.6 V to +8.5 V.
- d. Change the line voltage to 10% above the nominal.
- e. Remove the test load from the supply.
- f. CHECK—that the DMM reads from +7.6 V to +8.5 V.
- g. Remove all connections.
- h. This completes the Performance Check Procedure.



# INTERNAL ADJUSTMENT PROCEDURE

## Introduction

This procedure should be performed if the power module fails to meet the performance requirements of the electrical characteristics listed in the Specification section of this manual. To ensure continued instrument accuracy, we recommend that adjustment be performed every 1000 hours of operation or every 6 months if used infrequently. Adjustment is also recommended following repair or modification. Adjustments must be made in an ambient temperature of +20° C to +30° C.

## Services Available

Tektronix, Inc. provides complete instrument repair and adjustment at local field service centers and at the factory service center. Contact your local Tektronix field office or representative for further information.

## Test Equipment Required

Test equipment listed in Table 4-1 is required for adjustment of the TM 5006A. Specifications given for the test equipment are the minimum necessary for accurate adjustment. All test equipment is assumed to be correctly calibrated and operating within specification. If other test equipment is substituted, the calibration setup may need to be altered to meet the requirements of the equipment used.

## Adjustment Access

Remove the top cover to gain access to the supply buses and the adjustments. Figure 4-4 shows the adjustment locations.

### 1. Adjust 8.2 V Adj (R1011)

- Connect the DMM to the +8.2 and ground terminals shown in Figure 4-4.
- Set the Variable Voltage Transformer for nominal line voltage as indicated by the rear-panel voltage selector setting.
- CHECK—DMM for a reading of +8.2 V, within the limits of +8.18 V and +8.22 V.
- ADJUST—R1011, 8.2 V Adj for a DMM reading of +8.2 V.

### 2. Adjust Clock Frequency (R1010)

- Set the Variable Voltage Transformer for 90% of the nominal line voltage indicated by the rear-panel voltage selector setting.
- Connect the oscilloscope 10X probe tip to TP1040 and the probe ground to TP1030.
- Set the oscilloscope sweep rate to 2  $\mu$ s/div, and the vertical sensitivity to display a 5-div signal.
- Connect a load as described in Figure 4-3 between +8.2 V and ground.
- Connect a load as described in Figure 4-3 between +25 V and ground.
- Connect a load as described in Figure 4-3 between -25 V and ground.
- ADJUST—R1010 for minimum pulse width displayed on the screen.
- Remove all connections.
- This completes the internal adjustment procedure.

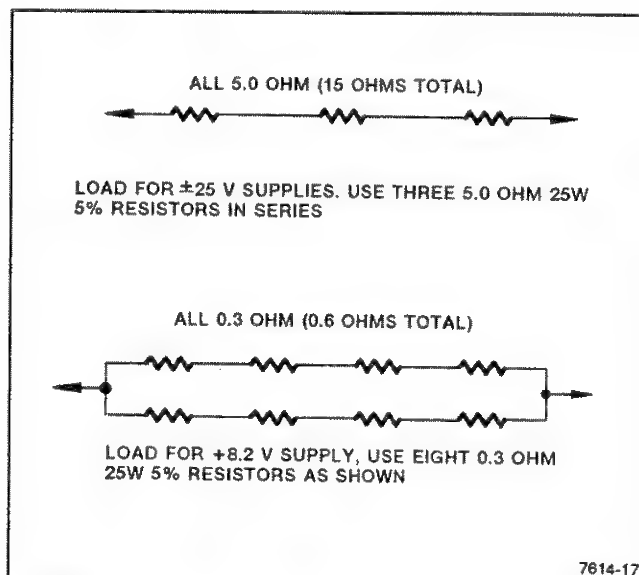


Fig. 4-3. Test loads for use with the adjustment procedure.

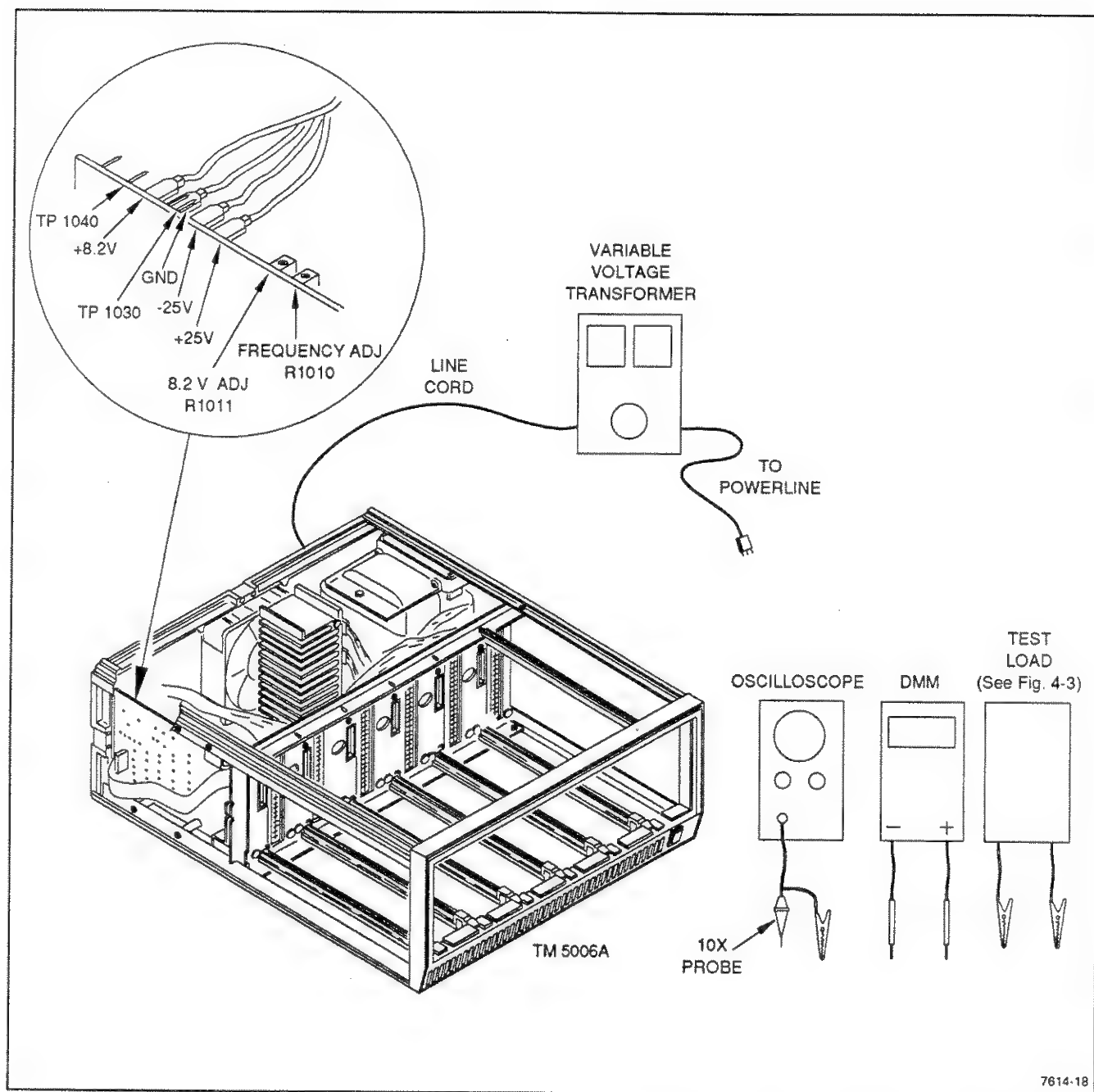


Fig. 4-4. Internal adjustment setup.

# MAINTENANCE

## Introduction

This section of the manual provides maintenance and service information for the TM 5006A Power Module, and information on custom plug-in kits for users that require a way to design their own plug-in units.

## Static Sensitive Components

### CAUTION

*Static discharge can damage any semiconductor component in this instrument.*

This instrument contains electrical components that are susceptible to damage from static discharge. See Table 5-1 for relative susceptibility of various classes of semiconductors. Static voltages of 1 kV to 30 kV are common in unprotected environments.

**Table 5-1**  
**Relative Susceptibility**  
**To Static Discharge Damage**

Semiconductor Classes	Relative-Susceptibility levels <sup>a</sup>
MOS or CMOS microcircuits or discretes, or linear microcircuits with MOS inputs. (Most Sensitive)	1
ECL	2
Schottky signal diodes	3
Schottky TTL	4
High-frequency bipolar transistors	5
JFETS	6
Linear microcircuits	7
Low-power Schottky TTL	8
TTL (Least Sensitive)	9

<sup>a</sup>Voltage equivalent for levels:

1 = 100 to 500 V      4 = 500 V      7 = 400 to 1000 V (est)  
 2 = 200 to 500 V      5 = 400 to 600 V      8 = 900 V  
 3 = 250 V      6 = 600 to 800 V      9 = 1200 V

(Voltage discharged from a 100 pF capacitor through a resistance of 100  $\Omega$ )

## Cleaning

This instrument should be cleaned as often as operating conditions require. Loose dust accumulated on the outside of the instrument can be removed with a soft cloth or a small brush. Remove dirt that remains with a soft cloth dampened in a mild detergent and water solution. Do not use abrasive cleaners.

Cleaning the interior of a unit should precede calibration since the cleaning processes could alter the settings of calibration adjustments. Use low-velocity compressed air (approximately 5 lb/in<sup>2</sup>) to blow off accumulated dust. Hardened dirt can be removed with a soft brush or cloth dampened in a solution of water and mild detergent.

### CAUTION

*Circuit boards and components must be dry before applying power.*

*Avoid using chemical cleaning agents that might damage plastic parts. Avoid chemicals containing benzene, toluene, xylene, acetone, or similar solvents.*

## Preventive Maintenance/Calibration

The TM 5006A Power Module does not require preventive maintenance.

To ensure proper operation, check the electrical adjustment of this power module after each 2,000 hours of operation, or every 12 months if used infrequently.

## Multi-pin Connectors

The pin connectors used to connect the wires to the interconnecting pins are clamped to the ends of the wires. To replace damaged multi-pin connectors, remove the old pin connector from the holder. Do this by inserting a scribe between the connector and holder to release the catch, and pull the connector from the holder. Clamp the replacement connector to the wire. Reinstall the connector in the holder.

If the individual end lead pin connectors are removed from the plastic holder, note the order of the individual wires for correct replacement in the holder.

## Instrument Disassembly

The exploded-view drawings associated with the Replaceable Mechanical Parts list (at the rear of this manual) may be helpful in the removal or disassembly of individual components or subassemblies.

### Cabinet Panel Removal

The top, side, and bottom covers will need to be removed for most repairs. Such removal is not mentioned in each procedure. As the covers would need to be removed before the individual circuit boards are located, it is assumed that they were off the instrument.

#### **WARNING**

*Dangerous voltages exist at several points throughout this instrument.*

*When the instrument is operated with the covers removed, do not touch exposed connections or components.*

*Disconnect power before cleaning the instrument or replacing parts.*

1. Remove the four screws attaching the four feet to the rear panel of the instrument. See Figure 5-1.

2. Slide the top panel and both side panels to the rear, and set aside.

3. Set the instrument on it's top.

4. Slide the two plastic bottom rail spacers to the rear, and set aside.

5. Remove the wire bail on the two front feet by compressing the bail where it enters the feet.

6. Slide the two front feet to the rear, and set aside.

7. Slide the bottom panel to the rear, and set aside.

8. To reassemble, reverse the order of removal. Remember, that the side panel with the handle goes on the left side of the instrument (side opposite power transformer).

### Series Pass Transistor Replacement

Use this procedure only for the ten series-pass transistors located along the bottom edge of the A10—Interface circuit board. You can access these transistors only from the bottom of the instrument.

A separate procedure is provided to remove the two High-Power compartment series-pass transistors located on the finned heatsink.

#### **NOTE**

*A new adhesive insulator plate must be applied to the transistor before installation. To maintain proper insulating characteristics, do not reuse the insulating plate from the transistor being replaced.*

a. Remove the securing screw, unsolder and remove the transistor being replaced, from the circuit board.

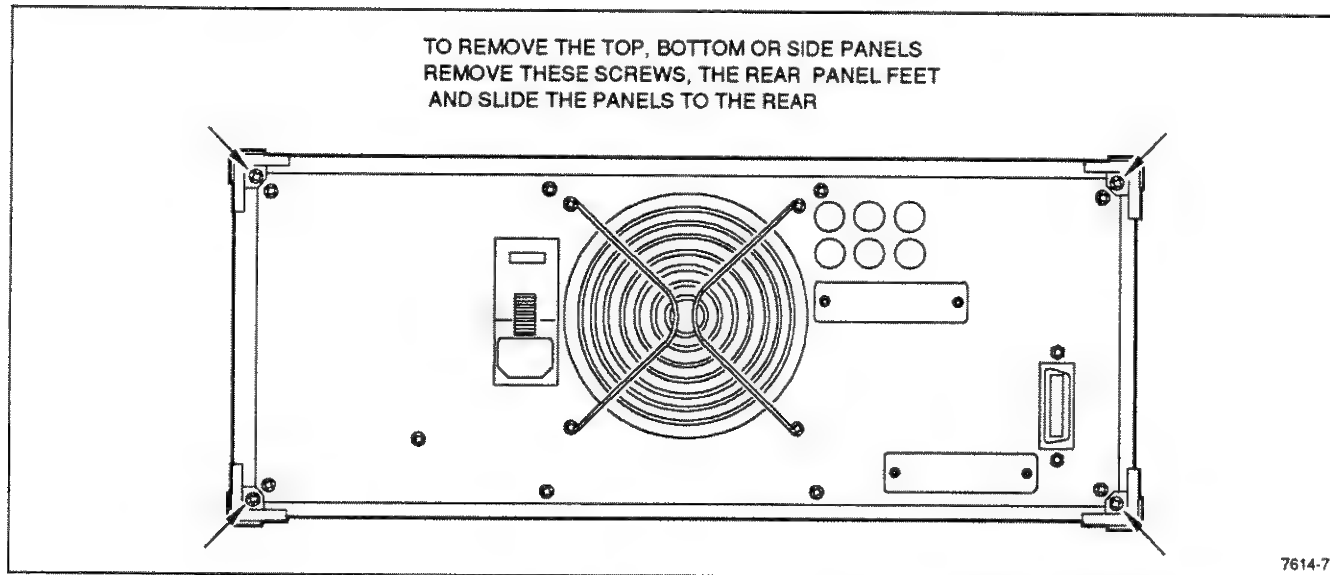


Fig. 5-1. Cabinet panel removal.

b. Apply a new adhesive insulator plate to the transistor side having exposed metal.

c. Insert the leads of the replacement transistor into the circuit board holes, with the insulating plate facing the metal chassis.

e. Reinstall the transistor securing screw.

f. Solder the transistor onto the board, applying minimum heat.

### High Power Series Pass Transistor Replacement

The two High Power compartment series pass transistors are located on the large finned heat sink along with the thermal cutout. Remove the heat sink as follows:

a. Set the instrument on its right side.

b. Disconnect the transistor and thermal cutout connector plugs.

c. Remove the two screws that secure the bottom of the heat sink to the A12—Converter circuit board. These two screws are accessed through holes in the chassis on the bottom of the instrument.

d. Hold heat sink in position and remove the 4-1/2 inch screw, spacer, washer, and locknut that secures the heat sink to the rear panel.

e. Remove heat sink from instrument.

f. Remove the securing screw, and remove the transistor being replaced from the heat sink.

#### NOTE

*You do not need to replace the mica insulator plate unless damaged. Apply a thin coating of heat conducting grease (e.g., Thermalcote™) between the mica insulator and the heat sink, and on the contact surface of the new transistor.*

g. To reassemble, reverse the order of removal.

### A10—Interface Circuit Board Removal

a. Remove the top and bottom guide rails as shown in Figure 5-2.

b. Remove the 12 screws that secure the Interface circuit board to the Interface chassis as shown in Figure 5-2.

c. Remove the 4 screws (with lockwashers) that secure the Interface chassis to the frame rails as shown in Figure 5-2.

d. Remove the cable support (nearest the Interface chassis) from the frame rail and slide Interface chassis toward the front of the instrument.

e. Remove the screws that secure the 10 series pass transistors to the bottom chassis.

f. Note the wire color coding, orientation, and position of the plugs and connectors on the rear of the Interface board. Disconnect all plugs and connectors from the rear of the Interface board.

g. Remove the 3 screws that secure each end of the Interface board, and remove the board.

h. To reinstall, reverse the order of removal.

### Rear panel Removal

a. Remove the 2 hex-post screws that secure the GPIB connector, using a 1/4-inch nut driver. See Figure 5-3.

b. Remove the screw and insulator block that secures rectifier CR1050 to the rear panel as shown in Figure 5-3.

c. Remove the 4-1/2 inch screw, spacer, washer and locknut that secures the finned heat sink to the rear panel.

d. Remove the 9 screws that secure the rear panel to the rear casting (use a T-20 Torx tip screwdriver) and pull away from the rear casting.

### A11—Regulator Circuit Board Removal

a. Remove the rear panel (see Rear Panel Removal procedure).

b. Note the wire color coding, orientation, and position of the plugs and connectors on the front and back of the Regulator board. Disconnect all plugs and connectors from the Regulator board.

c. Remove the 4 securing screws shown in Figure 5-4 and lift the Regulator board out through the top of the instrument.

d. To reinstall, reverse the order of removal.

### A12—Converter Board Removal

a. Remove the rear panel (see Rear Panel Removal procedure).

b. Remove the cooling fan power connector.

c. Note the wire color coding, orientation, and position of the plugs and connectors on the top of the Converter board. Disconnect all plugs and connectors from the Converter board.

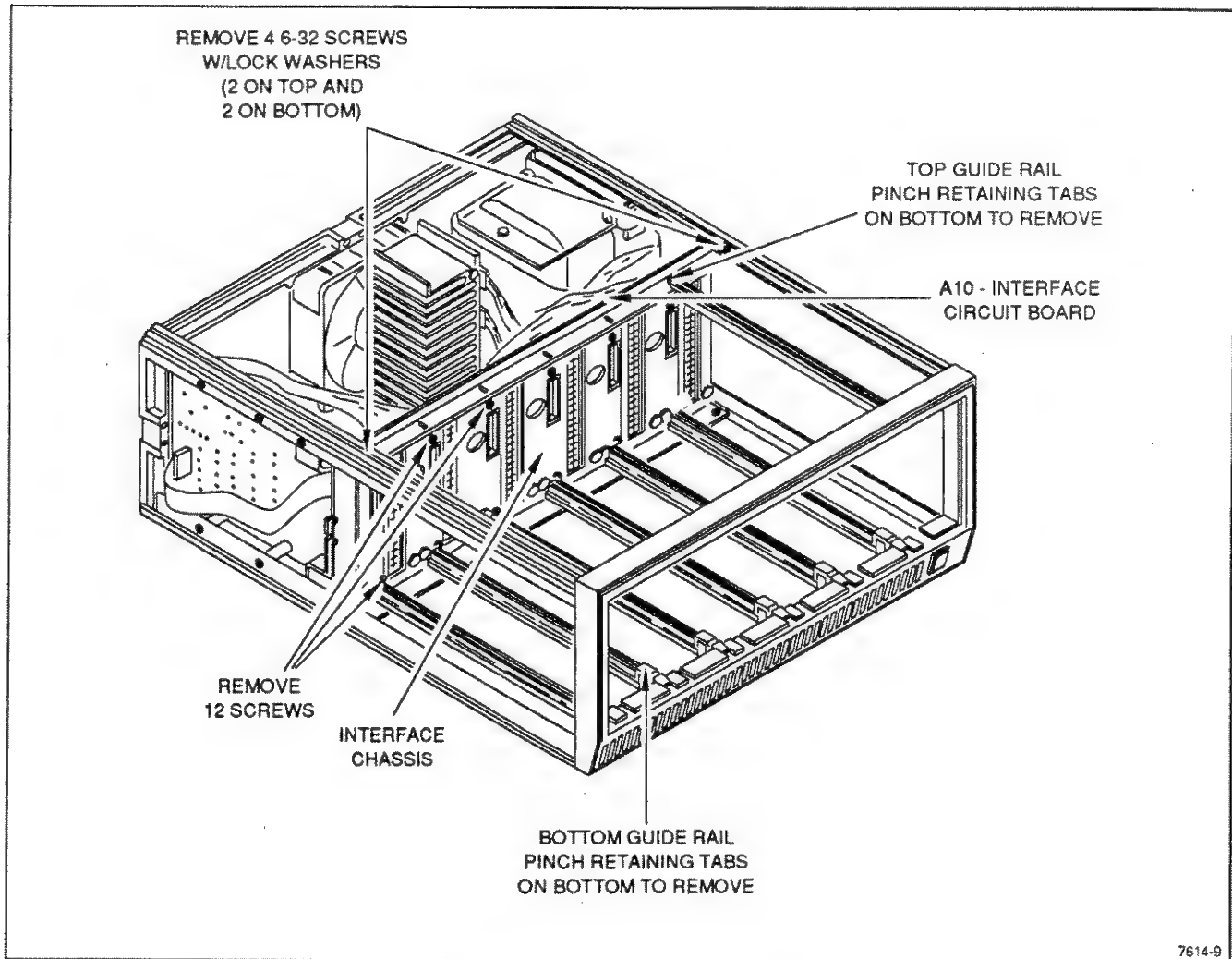


Fig. 5-2. Guide rail removal.

d. Remove the two screws that secure the switching transistors to the cable channel chassis, and lift off the plastic protective cover.

e. Note the color coding and orientation of the wires connected to the Line and Load connectors on the EMI filter. Disconnect all connectors from the EMI filter.

f. Remove the 2 screws that secure the EMI filter and lift out the filter.

g. Remove the 4 screws that secure the Converter board to the hex standoffs, and lift the board out through the top of the instrument.

### Switching Transistor Replacement

The switching transistors are soldered to the A12—Converter circuit board and heat sinked to the cable channel chassis.

a. Remove the two screws that secure the switching transistors to the cable channel chassis, and lift off the plastic protective cover.

b. Clip the leads of the transistor to be replaced and remove transistor. Unsolder and remove the clipped leads from the circuit board.

c. Bend the replacement transistor leads 90° 1/4-inch from transistor body (bend in same direction as tab on transistor body).

d. Trim the transistor's lead length to extend just past the back of the circuit board.

e. Apply a thin coating of heat conducting grease (e.g., Thermalcote™) between the ceramic insulator and the contact surface of the transistor.

f. Replace the plastic protective cover, and start the 2 securing screws.

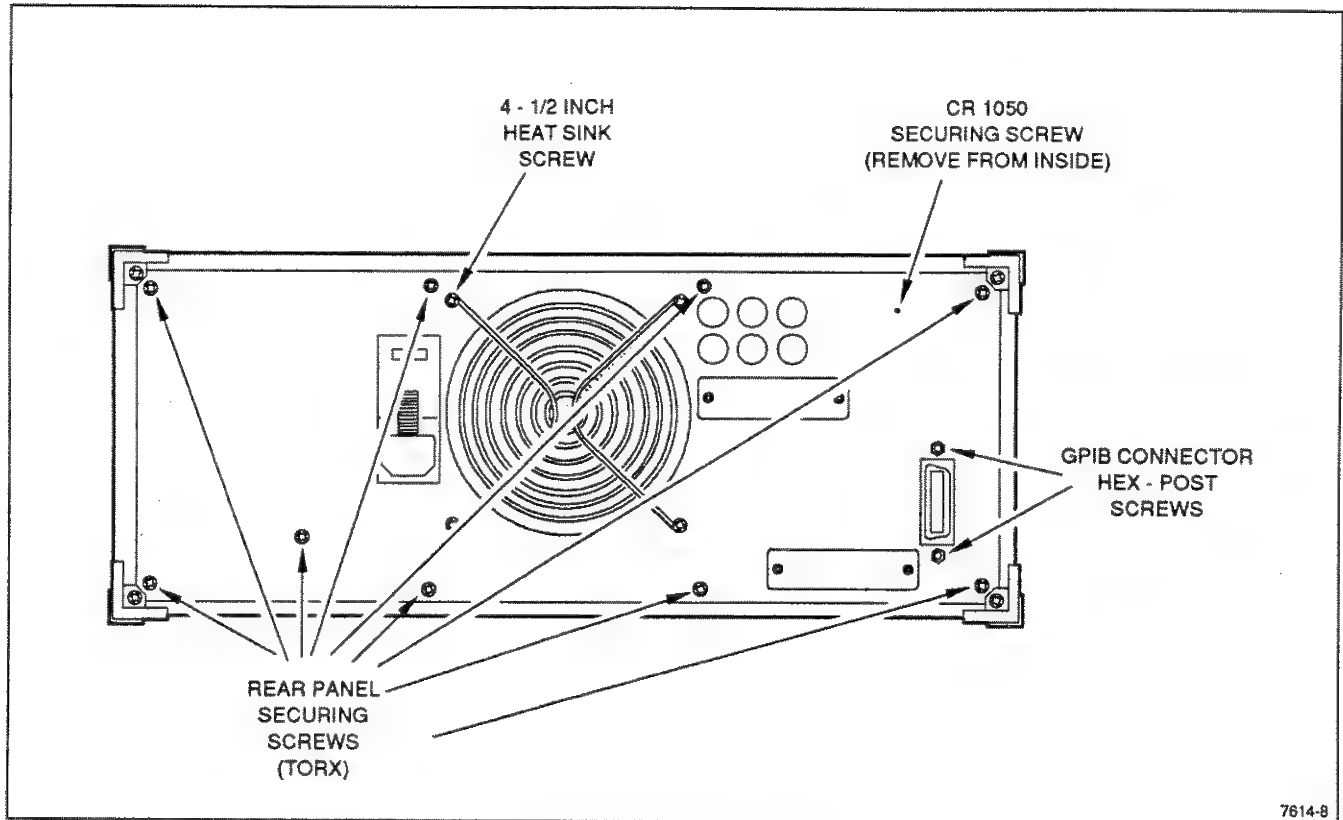


Fig. 5-3. Rear panel removal.

**CAUTION**

*To avoid fracturing the ceramic insulator, you must tighten the 2 screws evenly and securely—DO NOT overtighten.*

g. Solder the new transistor onto the board, applying minimum heat.

**Power Transformer Replacement**

a. Remove the rear panel (see Rear Panel Removal procedure).

b. Note the color coding and orientation of all the transformer wire connections, then disconnect all connections.

c. Remove the 4 screws that secure the transformer in place.

d. Lift the transformer out through the opening in the top of the instrument.

e. To reinstall, reverse the order of removal.

**Line Voltage Selector/Filter Removal**

a. Remove the rear panel (see Rear Panel Removal procedure).

b. Note the wire color coding, orientation, and position of the wires and connectors on the back of the line voltage selector/filter unit. Disconnect all wires and connectors from the unit.

c. Press the two edges of the butterfly spring (on the top of the unit) down flush with the top surface and move unit slightly toward the rear. Repeat with the butterfly spring on the bottom of the unit. Work unit back and forth until its free of the rear panel.

d. To reassemble, press unit into rear panel until the butterfly springs snap in the locked position, and reinstall the wires and connectors.

e. Reinstall the rear panel.

**Obtaining Replacement Parts**

Electrical and mechanical parts can be obtained through your local Tektronix Field Office or representative. However, it may be possible to obtain many of the standard electronic components from a local commercial source. Before purchasing or ordering a part from a source other

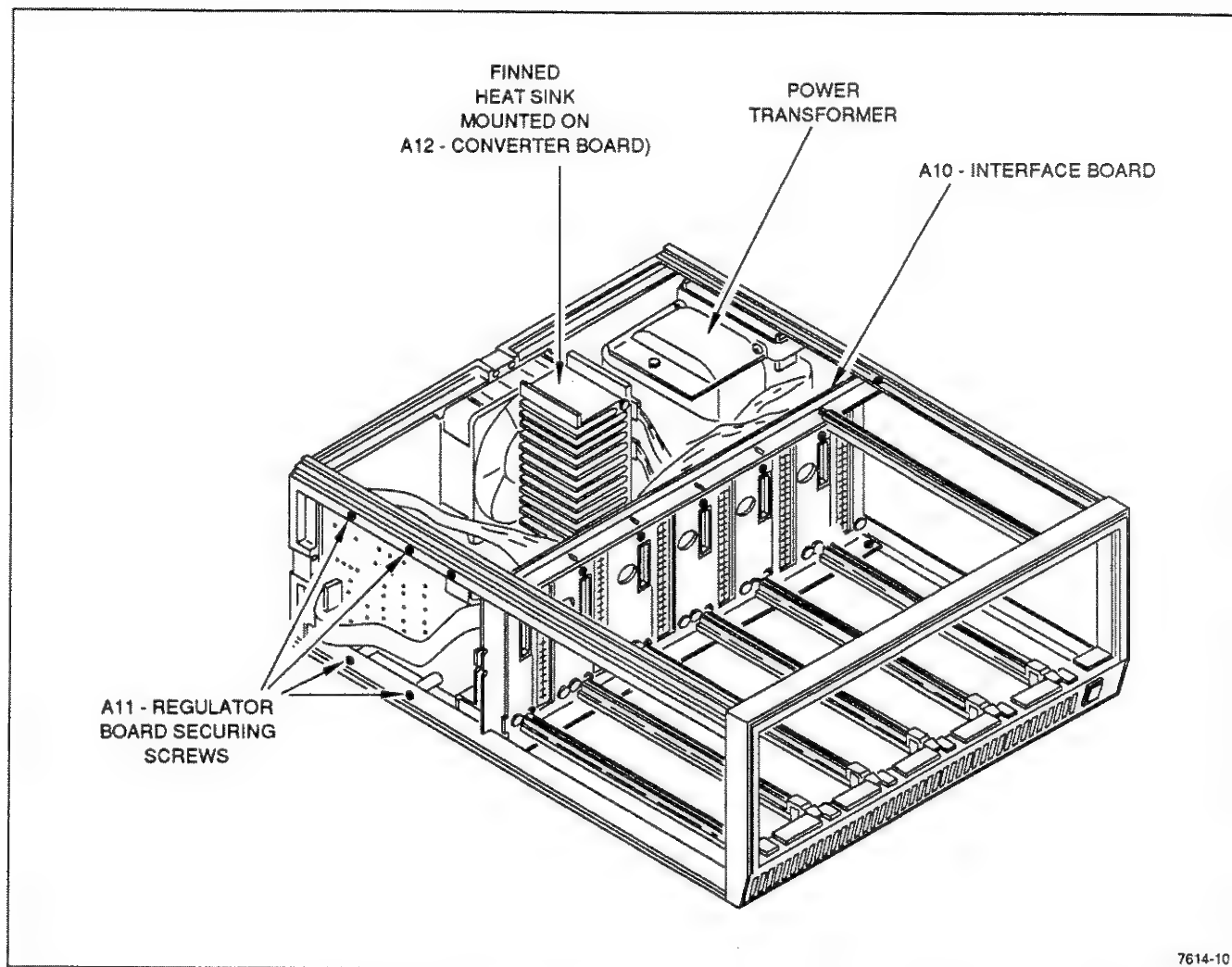


Fig. 5-4. Power supply circuit boards.

than Tektronix, Inc., check the Replaceable Electrical Parts list for the proper value, rating, tolerance, and description.

#### NOTE

*When selecting replacement parts, remember that the physical size and shape of a component may affect its performance in the instrument.*

Some parts are manufactured or selected by Tektronix, Inc., to satisfy particular requirements or are manufactured for Tektronix, Inc., to our specifications. Most of the mechanical parts used in this instrument have been manufactured by Tektronix, Inc.. To determine the manufacturer, refer to the Replaceable Parts list and the Cross Reference index, Mfr. Code Number to Manufacturer.

When ordering replacement parts from Tektronix, Inc., include the following information:

1. Instrument type and option number.
2. Instrument serial number.
3. A description of the part (if electrical, include complete circuit number).
4. Tektronix part number.

#### Packaging Information

A list of standard accessories (and part numbers) is located in the Replaceable Mechanical Parts list.

If the Tektronix instrument is to be shipped to a Tektronix Service Center for service or repair, attach a tag showing owner (with address) and the name of an individual at your firm that can be contacted. Include the complete instrument serial number and a description of the service required.



Save and reuse the package in which your instrument was shipped. If the original packaging is unfit for use or not available, repackage the instrument as follows:

Surround the instrument with polyethylene sheeting to protect the finish of the instrument. Obtain a corrugated cardboard carton with inside dimensions of no less than 6 inches greater than the instrument dimensions.

Use a carton with a test strength of at least 200 pounds per square inch. Cushion the instrument by tightly packing 3 inches of dunnage or urethane foam between carton and instrument on all sides. Seal the carton with shipping tape or an industrial stapler.

## CUSTOM PLUG-IN KITS

### Applications

Tektronix, Inc. provides a variety of blank plug-in kits (see Table 5-2) for users that require a way to design their own plug-in units:

- ☐ Test engineers often require custom interfaces such as specialized signal or timing generators, amplifiers or converters, and signal routers to complete a test system.
- ☐ Design engineers frequently need to prototype a component manufacturer's "suggested circuit" or integrate an evaluation board when selecting a new component.
- ☐ Educators need sturdy demonstration aids and circuit construction tools for senior lab projects that do not tie up power supplies and valuable bench space.
- ☐ Instrument and equipment manufacturers in focused applications require a platform that does not require the development of new electrical and mechanical packages.

This is why the modular instruments line includes custom plug-in kits. The kits provide a mechanical package and development boards that allow rapid construction and wiring of circuits. The plug-ins are compatible with both TM 500 and TM 5000 mainframe power supplies.

### Power Where It's Needed

Each 56-conductor slot connector supplies a wide assortment of dc voltages and isolated ac voltages to generate +5 V supplies, dual analog supplies, and other specialized sources. In addition, each mainframe slot has a dedicated pair of series pass NPN and PNP power transistors internal to the mainframe to simplify power supply design. Approximately 15 watts can be dissipated per slot of a TM 5000 mainframe (10 watts for a TM 500 mainframe).

### Signals To Go

In addition to delivering power to the plug-ins, each 56-conductor slot edge-connector includes uncommitted conductors to transfer signals (with Option 2) to and from other slots, or to and from the rear panel of power module mainframes (up to 6 in a TM 506A or TM 5006A mainframe). The Rear-Interface Data Book, listed in Table 5-2, describes the rear-interface system in greater detail and lists rear interface signals for existing instruments. A Flexible Extender Cable (see Table 5-2) for the 56-conduc-

tor edge connector is available to extend the plug-in kit outside of the mainframe housing. A series of construction notes provides direction for building custom circuits.

Also, hardware is available to add GPIB capability to any of the custom plug-in kits listed below.

#### Single Compartment With Power Supply Board Kit

This kit includes parts and a pre-etched circuit board layout for (1) a ground-referenced positive and negative supply, capable of 7 to 20 V at up to 400 mA, and (2) a ground-reference supply, nominally 5 V, not adjustable, with up to 1 ampere current capability. The circuit board includes the edge-connector interface and has about 30 square inches of 0.1 inch grid perforated board with plated holes for circuit development.

#### Single Compartment With Development Board Kit

This kit comes without the power supply components or the pre-etched power supply circuit. The board includes the edge-connector interface and has about 35 square inches of board development area.

#### Single Compartment Without Board Kit

This kit comes without a board for applications where custom circuit boards are fabricated.

#### Dual Compartment With Development Boards Kit

This kit has two development boards (30 and 35 square inches of development area) for applications that require additional power, circuit area, or front-panel space.

Table 5-2  
Custom Plug-In Kit Ordering Information

Item	Order Part Number
Single Compartment with Power Supply Board <sup>1</sup>	040-0803-XX
Single Compartment with Uncommitted Board <sup>1</sup>	040-0652-XX
Single Compartment Without Board <sup>1</sup>	040-0821-XX
Dual Compartment with Two Boards <sup>1</sup>	040-0754-XX
Rear-Interface Data Book	070-2088-XX
Flexible Extender Cable	067-0645-XX

<sup>1</sup>GPIB hardware listing is available with kit.

## Custom Circuit Board Fabrication

The following information is provided for those engineers and technicians who want to fabricate their own circuit boards.

Figure 5-5 illustrates a typical edge-conductor main interface and GPIB circuit board. The illustration provides the circuit board dimensions and hole spacing required to fit the TM 5000-series Power Modules.

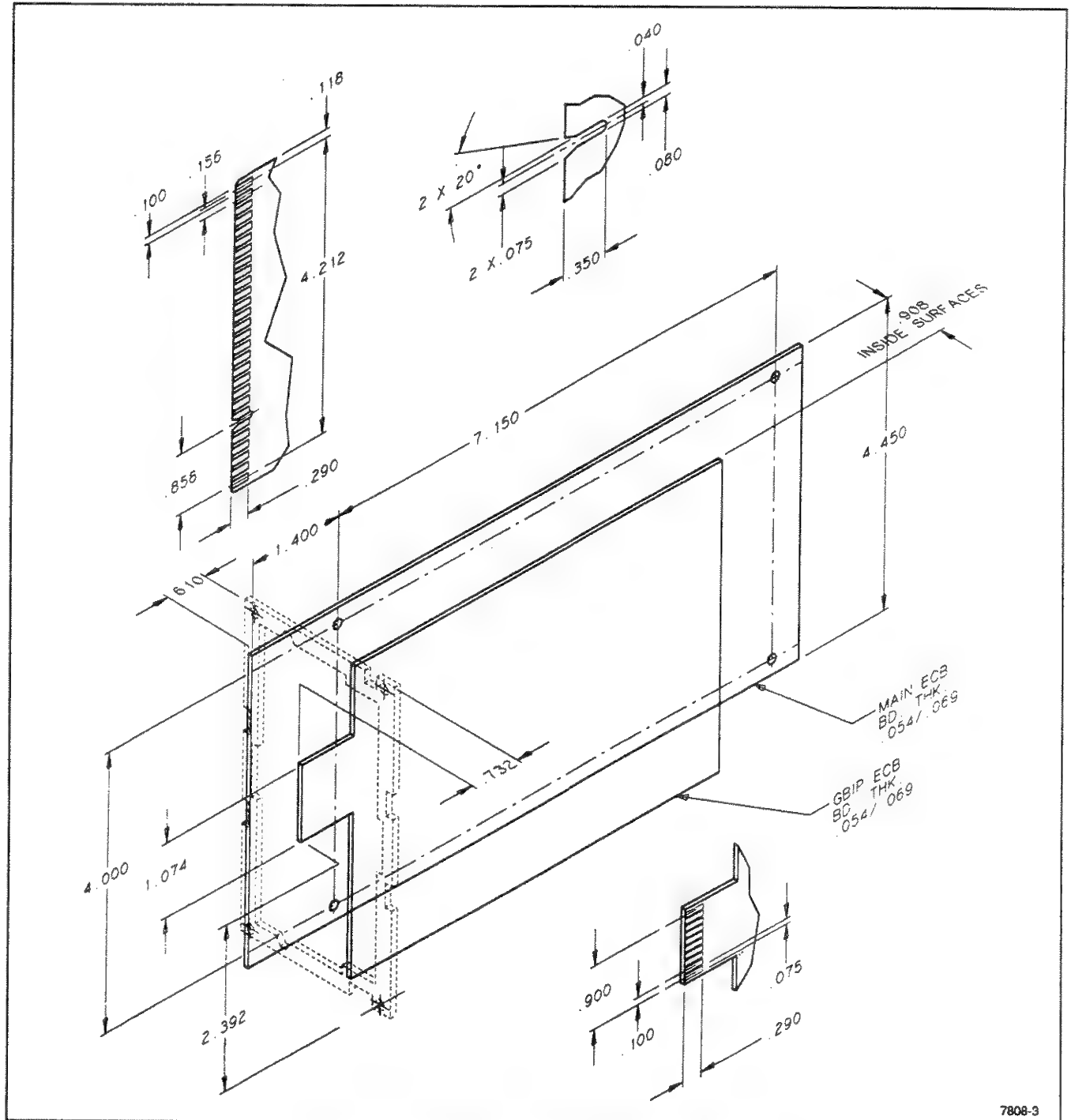


Figure 5-5. Dimensions for plug-in module circuit boards.

## REAR INTERFACE INFORMATION

### PWR Indicator

A signal out on pin 6B of the plug-in interface connector provides the plug-ins with power supply status information. See Figure 5-6. This signal is TTL compatible with  $\leq 30 \Omega$  output impedance. The maximum plug-in load per compartment is one standard TTL load. No pull-up resistors are allowed. The maximum capacitance per compartment must not exceed 150 pF. The fall and rise time ( $t_f$  and  $t_r$ ) is  $\leq 20 \mu s$ .

### Connector Pin Assignments

Figure 5-7 shows the pin assignments for the power module outputs to the plug-ins. Pins 14 through 28 (not shown in illustration) are reserved for signal connections.

See Sections 2 and 6 of this manual and the plug-in manuals for further information.

Figure 5-8 shows the pin assignments for the plug-in compartment GPIB connector.

Figure 5-9 shows the pin assignments for ribbon cable connector J4060, located on the rear of the A11—Regulator board.

Figure 5-10 shows the pin assignments for GPIB connector J4061, located on the instrument rear panel.

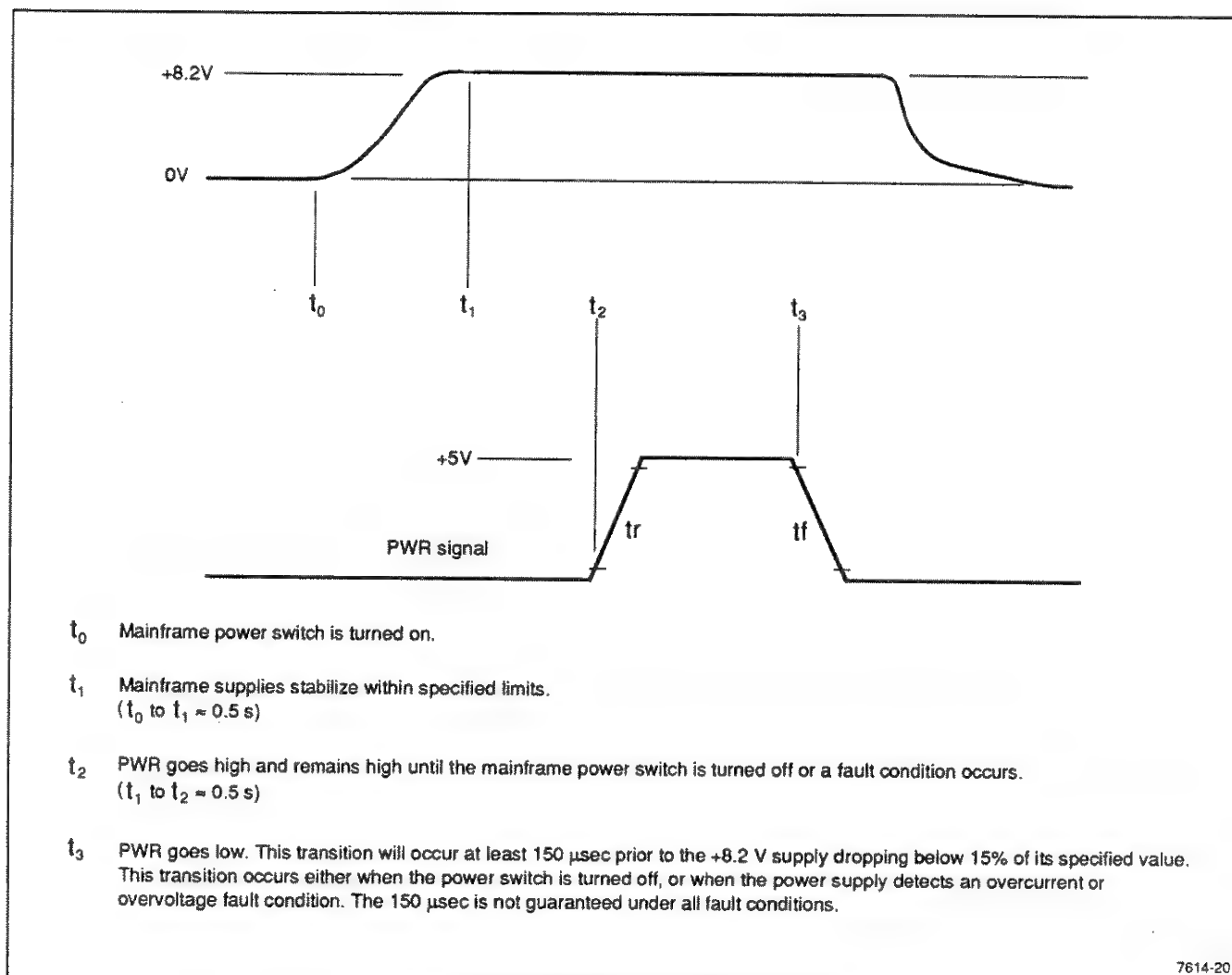


Fig. 5-6. PWR signal timing diagram.

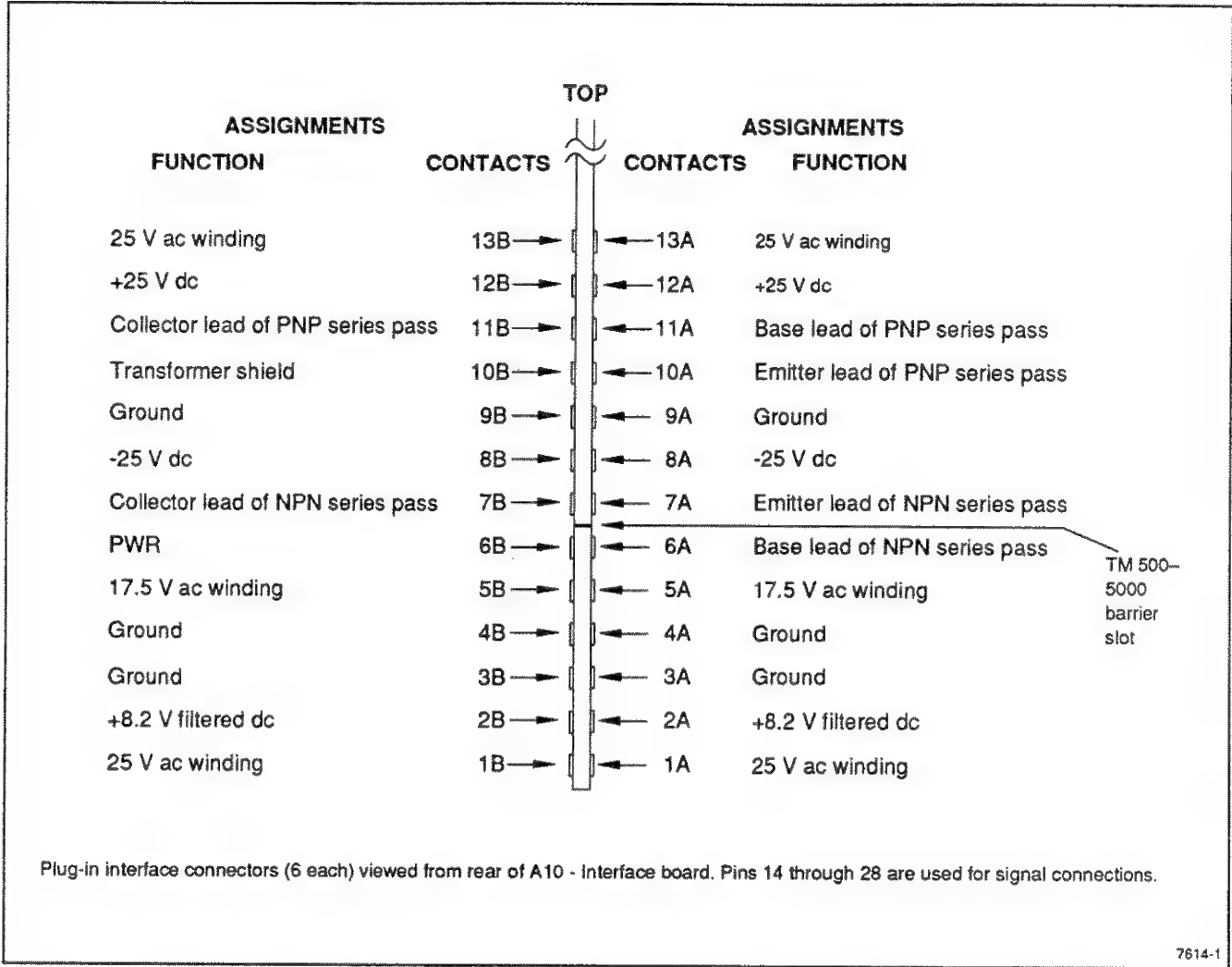


Fig. 5-7. Plug-in interface connector pin assignments.

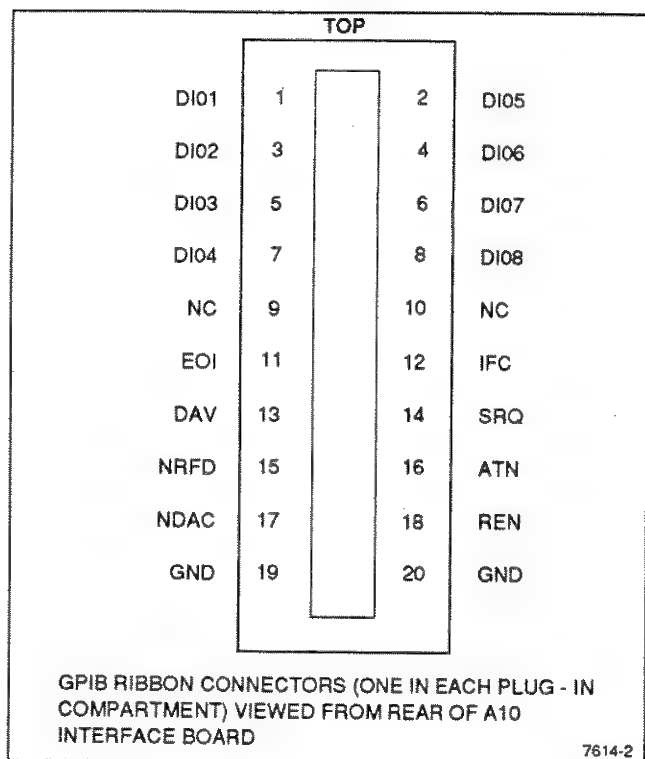


Fig. 5-8. Plug-in GPIB connector pin assignment.

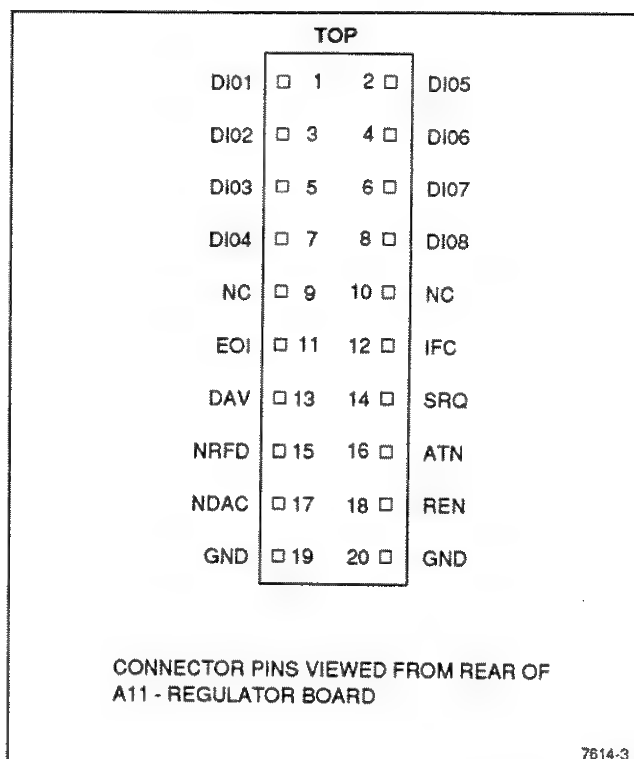


Fig. 5-9. Ribbon connector J4060 pin assignments.

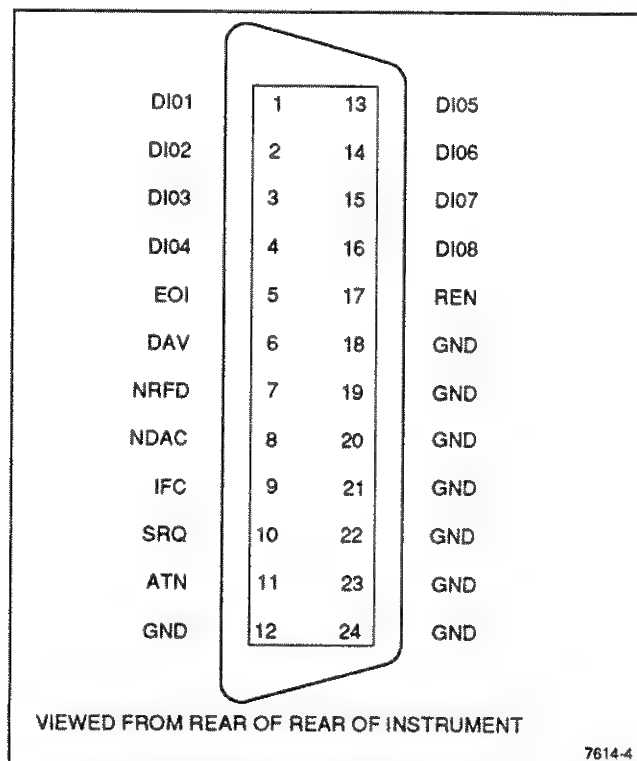


Fig. 5-10. Rear-panel GPIB connector pin assignment.

# OPTIONS

The following options are available for the TM 5006A.

## Options A1 Through A5

The following line cord options are available for the TM 5006A Power Module. Refer to Table 2-1, Power-cord and Plug Identification, in Section 2 for further information on Options A1 through A5.

**Option A1**—changes the power to Universal European (220 Volt, 6 Ampere).

**Option A2**—changes the power to United Kingdom (240 Volt, 6 Ampere).

**Option A3**—changes the power to Australian (240 Volt, 6 Ampere).

**Option A4**—changes the power to North American (250 Volt, 10 Ampere).

**Option A5**—changes the power to Switzerland (220 Volt, 6 Ampere).

## Option 02

This option adds 25-mil square pin connectors to the rear of the interconnecting jacks at all pins from 14A and B to pins 28A and B. This option also adds bnc connectors and a 50-pin connector to the rear panel. These connectors are not prewired. Prepared jumpers, coaxial cables, square pins, and interconnection jack barriers are included in the kit.

## Option 10

Provides factory installed rackmounting hardware on the instrument cabinet, and a hardware kit for mounting in a standard 19-inch rack.

## Option 12

Provides a combination of Options 02 and 10 above.

## Option 15

Provides additional EMI shielding for the TM 5006A.





## Section 7: REPLACEABLE ELECTRICAL PARTS

### Parts Ordering Information

Replacement parts are available from or through your local Tektronix sales and service office or field representative.

When ordering parts, include the following information in your order: part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix service center or field representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

### List of Assemblies

A list of assemblies is given at the beginning of the Electrical Parts List. The assemblies are listed in numerical order. When the complete component number of a part is known, this list will identify the assembly in which the part is located.

### Cross Index-Mfr Code Number to Manufacturer

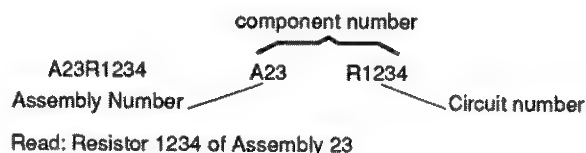
The Mfr. Code Number to Manufacturer Cross Index for the Electrical Parts List is located immediately following this format information. The Cross Index provides codes, names and addresses for the manufacturers of components listed in the Electrical Parts List.

### Abbreviations

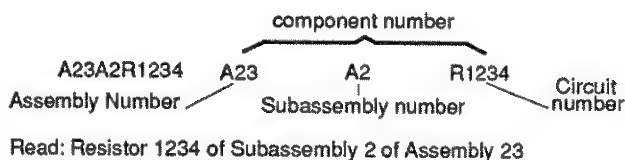
Abbreviations in this section conform to American National Standard Y1.1.

### Component Number (column 1)

Example a.



Example b.



The circuit component number appears on the diagrams and circuit board illustrations. Each diagram and circuit board illustration is clearly marked with the assembly number. Assembly numbers are also marked on the mechanical exploded views located in the mechanical parts list. The component number is obtained by adding the assembly number prefix to the circuit number.

The Electrical Parts List is divided and arranged by assemblies in numerical sequence (e.g., assembly A1 with its subassemblies and parts, precedes assembly A2 with its subassemblies and parts).

Chassis-mounted parts have no assembly number prefix and are located at the end of the Electrical Parts List.

**Tektronix Part  
Number  
(column 2)**

Indicates part number to be used when ordering replacement part from Tektronix.

**Serial Number  
(columns 3 & 4)**

Column three (3) indicates the serial number at which the part was first used. Column four (4) indicates the serial number at which the part was removed. No serial number indicates part is good for all serial numbers.

**Name and  
Description  
(column 5)**

In the Parts List, an Item Name is separated from the description by a colon(:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

**Mfr. Code  
(column 6)**

Indicates the code number of the actual manufacturer of the part. (Code to name and address cross reference can be found immediately after this page.)

**Mfr. Part Number  
(column 7)**

Indicates actual manufacturer's part number.

## CROSS INDEX — MFR CODE NUMBER TO MANUFACTURER

Mfr Code	Manufacturer	Address	City, State, Zip Code
00779	AMP INC	2800 FULLING MILL	HARRISBURG PA 17105
00853	SANGAMO WESTON INC COMPONENTS DIV	SANGAMO RD PO BOX 128	PICKENS SC 29671-9716
01121	ALLEN-BRADLEY CO	1201 S 2ND ST	MILWAUKEE WI 53204-2410
03508	GENERAL ELECTRIC CO	W GENESEE ST	AUBURN NY 13021
04222	AVX CERAMICS DIV OF AVX CORP	19TH AVE SOUTH P O BOX 867	MYRTLE BEACH SC 29577
04713	MOTOROLA INC	5005 E MCDOWELL RD	PHOENIX AZ 85008-4229
05245	CORCOM INC	1600 WINCHESTER RD	LIBERTYVILLE IL 60048-1267
09023	CORNELL-DUBILIER ELECTRONICS	2652 DALRYMPLE ST	SANFORD NC 27330
0J7N9	MCX INC	30608 SAN ANTONIO ST	HAYWARD CA 94544
0J9R2	HARRISON ELECTRIC CO LTD	ASAHI MACHI 5-CHOME IMABARI	EHIME JAPAN
0JR03	ZMAN AND ASSOCIATES	7633 S 180th	KENT WA 98032
12969	UNITRODE CORP	5 FORBES RD	LEXINGTON MA 02173-7305
13409	SENSITRON SEMICONDUCTOR	221 W INDUSTRY COURT	DEER PARK NY 11729-4605
14552	MICROSEMI CORP	2830 S FAIRVIEW ST	SANTA ANA CA 92704-5948
14604	ELMWOOD SENSORS INC SUB OF FASCO INDUSTRIES INC	500 NARRAGANSETT PARK DR PO BOX 2325	PAWTUCKET RI 02861-4325
15454	KETEMA	2900 BLUE STAR STREET	ANAHEIM CA 92806-2591
19701	PHILIPS COMPONENTS DISCRETE PRODUCTS	PO BOX 760	MINERAL WELLS TX 76067-0760
1W344	UNITED CHEMI-CON INC	9801 W HIGGINS	ROSEMONT IL 60018-4704
22526	DU PONT E I DE NEMOURS AND CO INC	515 FISHING CREEK RD	NEW CUMBERLAND PA 17070-3007
24165	SPRAGUE ELECTRIC CO	267 LOWELL ROAD	HUDSON NH 03051
25088	SIEMENS CORP	186 WOOD AVE S	ISELIN NJ 08830-2704
25403	PHILIPS COMPONENTS DISCRETE PRODUCTS	GEORGE WASHINGTON HWY	SMITHFIELD RI 02917
26742	METHODE ELECTRONICS INC	7447 W WILSON AVE	CHICAGO IL 60656-4548
27014	NATIONAL SEMICONDUCTOR CORP	2900 SEMICONDUCTOR DR	SANTA CLARA CA 95051-0606
27264	MOLEX INC	2222 WELLINGTON COURT	LISLE IL 60532-1613
32997	BOURNS INC	1200 COLUMBIA AVE	RIVERSIDE CA 92507-2114
51406	MURATA ERIE NORTH AMERICA INC	2200 LAKE PARK DR	SMYRNA GA 30080
54937	DEYOUNG MANUFACTURING INC	12920 NE 125TH WAY	KIRKLAND WA 98034-7716
55680	NICHICON /AMERICA/ CORP	927 E STATE PKY	SCHAUMBURG IL 60195-4526
57668	ROHM CORP	8 WHATNEY	IRVINE CA 92713
58050	TEKA PRODUCTS INC	45 SALEM ST	PROVIDENCE RI 02907
58421	KD COMPONENTS INC	3016 S ORANGE AVE	SANTA ANA CA 92707-4248
59660	TUSONIX INC	7741 N BUSINESS PARK DR	TUCSON AZ 85740-7144
60705	CERA-MITE CORPORATION	1327 6TH AVE	GRAFTON WI 53024-1831
6L334	DIODES INC	9957 CANOGA AVENUE	CHATSWORTH CA 91311
70903	COOPER BELDEN ELECTRONICS WIRE AND CABLE		
71400	BUSSMANN DIV OF COOPER INDUSTRIES INC	114 OLD STATE RD PO BOX 14460	ST LOUIS MO 63178
75042	IRC ELECTRONIC COMPONENTS	401 N BROAD ST	PHILADELPHIA PA 19108-1001
75498	MULTICOMP INC	3005 SW 154TH TERRACE #3	BEAVERTON OR 97006
75915	LITTELFUSE INC	800 E NORTHWEST HWY	DES PLAINES IL 60016-3049
7W718	MARQUARDT SWITCHES INC	2711 ROUTH 20 EAST	CAZENOVIA NY 13035-1219
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR	BEAVERTON OR 97077-0001
82877	ROTRON INC	7 HASBROUCK LN	WOODSTOCK NY 12498-1807
84411	AMERICAN SHIZUKI CORP	301 WEST O ST	OGALLALA NE 69153-1844
91636	CURTIS INDUSTRIES INC	34999 CURTIS BLVD	EASTLAKE OH 44094-4823

CROSS INDEX - MFR CODE NUMBER TO MANUFACTURER

Mfr Code	Manufacturer	Address	City, State, Zip Code
91637	DALE ELECTRONICS INC	2064 12TH AVE	COLUMBUS NE 68601-3632
95238	CONTINENTAL CONNECTOR CORP	34-63 56TH ST	WOODSIDE NY 11377-2121
TK0515	EVOX-RIFA INC	100 TRI-STATE INTERNATIONAL	LINCOLNSHIRE IL 60015
TK1601	PULSE ENGINEERING INC	2801 MOORPARK AVE	SAN JOSE CA 95128
TK1997	COLUMBIA GORGE CENTER	2940 THOMPSEN RD	HOOD RIVER OR 97031
TK2073	TOCOS AMERICA INC	565 W GULF ROAD	ARLINGTON HEIGHTS IL 60005
TK2292	SENSOR AND SWITCHES INC	PO BOX 3297	LEXINGTON OH 44904

Component No.	Tektronix Part Number	Serial Number Effect	Discont	Part Name & Description	Mfr Code	Mfr Part Number
A10	671-0621-02			CIRCUIT BD ASSY:MAIN INTERCONNECT	80009	671-0621-02
A10	671-2117-00			CIRCUIT BD ASSY:OPT 2 MAIN INTERCONNECT (OPTION 02/12 ONLY)	80009	671-2117-00
A11	671-1381-00	B010100	B010606	CIRCUIT BD ASSY:REGULATOR	80009	671-1381-00
A11	671-1381-01	B010607	B011090	CIRCUIT BD ASSY:REGULATOR	80009	671-1381-01
A11	671-1381-02	B011091		CIRCUIT BD ASSY:REGULATOR	80009	671-1381-02
A12	671-1382-00	B010100	B011090	CIRCUIT BD ASSY:CONVERTOR	80009	671-1382-00
A12	671-1382-01	B011091	B011592	CIRCUIT BD ASSY:CONVERTOR	80009	671-1382-01
A12	671-1382-02	B011593		CIRCUIT BD ASSY:CONVERTOR	80009	671-1382-02
A10	671-0621-02			CIRCUIT BD ASSY:MAIN INTERCONNECT	80009	671-0621-02
A10	671-2117-00			CIRCUIT BD ASSY:OPT 2 MAIN INTERCONNECT (OPTION 02/12 ONLY)	80009	671-2117-00
A10C2011	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2013	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C2014	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2019	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C2021	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2023	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2037	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2038	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2041	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C2043	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C2044	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C2051	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C2053	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2055	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2064	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2065	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2070	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C2073	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C2074	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C2075	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C3016	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C3017	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C3021	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C3022	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C3043	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C3044	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C3053	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C3055	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C3067	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C3068	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C3075	281-0774-00			CAP,FXD,CER DI:0.022MFD,20%,100V	04222	SA101E223MAA
A10C3076	281-0775-01			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A10C3077	290-0194-00			CAP,FXD,ELCTLT:10UF,+50-10%,100V	00853	556DC100T100B
A10C3078	290-0194-00			CAP,FXD,ELCTLT:10UF,+50-10%,100V	00853	556DC100T100B
A10CR2034	152-0198-00			SEMICON DVC,DI:RECT,SI,200V,3A	03508	1N5624
A10CR2037	152-0198-00			SEMICON DVC,DI:RECT,SI,200V,3A	03508	1N5624
A10CR2038	152-0198-00			SEMICON DVC,DI:RECT,SI,200V,3A	03508	1N5624
A10J1005	131-1857-00			CONN,HDR:PCB,;MALE,STR,1 X 36,0.1 CTR,0.230	58050	082-3644-SS10
A10J1025	131-1857-00			CONN,HDR:PCB,;MALE,STR,1 X 36,0.1 CTR,0.230	58050	082-3644-SS10
A10J1045	131-1857-00			CONN,HDR:PCB,;MALE,STR,1 X 36,0.1 CTR,0.230	58050	082-3644-SS10
A10J1065	131-1857-00			CONN,HDR:PCB,;MALE,STR,1 X 36,0.1 CTR,0.230	58050	082-3644-SS10
A10J1070	131-1857-00			CONN,HDR:PCB,;MALE,STR,1 X 36,0.1 CTR,0.230	58050	082-3644-SS10
A10J2041	131-2427-01			TERM,QIK DISC.:PCB,;MALE TAB,0.250 X 0.032	00779	62650-1
A10J2043	131-2427-01			TERM,QIK DISC.:PCB,;MALE TAB,0.250 X 0.032	00779	62650-1
A10J2045	131-2427-01			TERM,QIK DISC.:PCB,;MALE TAB,0.250 X 0.032	00779	62650-1

# Replaceable Electrical Parts—TM 5006A

Component No.	Tektronix Part Number	Serial Number Effect      Discont	Part Name & Description	Mfr Code	Mfr Part Number
A10J2047	131-2427-01		TERM, QIK DISC.:PCB,;MALE TAB,0.250 X 0.032	00779	62650-1
A10J2079	131-2576-00		CONN,HDR PWR.:PCB,;MALE,STR,1 X 6,0.156 CTR	26742	3109-11-206-01
A10J3015	131-1078-00		CONN,EDGE CARD:PCB,;STR,2 X 28,0.156 CTR	95238	X600-11-56Y25GDF-30N
A10J3025	131-1078-00		CONN,EDGE CARD:PCB,;STR,2 X 28,0.156 CTR	95238	X600-11-56Y25GDF-30N
A10J3040	131-1078-00		CONN,EDGE CARD:PCB,;STR,2 X 28,0.156 CTR	95238	X600-11-56Y25GDF-30N
A10J3055	131-1078-00		CONN,EDGE CARD:PCB,;STR,2 X 28,0.156 CTR	95238	X600-11-56Y25GDF-30N
A10J3065	131-1078-00		CONN,EDGE CARD:PCB,;STR,2 X 28,0.156 CTR	95238	X600-11-56Y25GDF-30N
A10J3080	131-1078-00		CONN,EDGE CARD:PCB,;STR,2 X 28,0.156 CTR	95238	X600-11-56Y25GDF-30N
A10Q3005	151-0462-00		TRANSISTOR,PWR:BIPOLAR,PNP;100V,3.0A,3.0MHZ	04713	TIP30C
A10R2047	315-0100-00		RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10RROOJ
A10R3010	308-0142-00		RES,FXD,WW:30 OHM,5%,3W	91637	CW2B30RROOJ
A10R3011	308-0740-00		RES,FXD,WW:20 OHM,1%,3W	91637	RS2BK20RROOF
A10R3012	315-0332-00		RES,FXD,FILM:3.3K OHM,5%,0.25W	57668	NTR25J-E03K3

Component No.	Tektronix Part Number	Serial Number Effect	Discont	Part Name & Description	Mfr Code	Mfr Part Number
A11	671-1381-00	B010100	B010606	CIRCUIT BD ASSY:REGULATOR	80009	671-1381-00
A11	671-1381-01	B010607	B011090	CIRCUIT BD ASSY:REGULATOR	80009	671-1381-01
A11	671-1381-02	B011091		CIRCUIT BD ASSY:REGULATOR	80009	671-1381-02
A11C1030	281-0563-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SA305E474MAA
A11C1031	281-0771-00			CAP,FXD,CER DI:2200PF,20%,200V	04222	SA102C222MAA
A11C1040	281-0563-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SA305E474MAA
A11C1041	281-0563-00			CAP,FXD,CER DI:0.47UF,20%,50V	04222	SA305E474MAA
A11C2010	283-0711-00			CAP,FXD,MICA DI:2700PF,2%,500V	09023	CD19FD272G03
A11C2011	281-0788-00			CAP,FXD,CER DI:470PF,10%,100V	04222	SA102C471KAA
A11C2020	290-0818-00			CAP,FXD,ELCTLT:390UF,+100-10%,40V	24165	672D397H040DS5C
A11C2021	290-0818-00			CAP,FXD,ELCTLT:390UF,+100-10%,40V	24165	672D397H040DS5C
A11C2030	290-0818-00			CAP,FXD,ELCTLT:390UF,+100-10%,40V	24165	672D397H040DS5C
A11C2031	290-0818-00			CAP,FXD,ELCTLT:390UF,+100-10%,40V	24165	672D397H040DS5C
A11C2040	290-1237-00			CAP,FXD,ELCTLT:12000PF,20%,16WVDC	1W344	SME16VN123M22X40LLV
A11C3010	283-0177-05			CAP,FXD,CER DI:1UF,+80-20%,25V	04222	SR305E105ZAATR
A11C3011	281-0788-00			CAP,FXD,CER DI:470PF,10%,100V	04222	SA102C471KAA
A11C3012	281-0876-00			CAP,FXD,CER DI:5.6PF,+/- 0.5PF	04222	MA107A5R6DAA
A11C3013	281-0813-00			CAP,FXD,CER DI:0.047UF,20%,50V	04222	SA105E473MAA
A11C3020	290-0943-00	B010100	B010606	CAP,FXD,ELCTLT:47UF,+50-20%,25V	1W344	KMC25VB47RM6X11LL
A11C3020	290-0745-00	B010607		CAP,FXD,ELCTLT:22UF,+50-20%,25WVDC	1W344	SM63VB22RM8X11LL
A11C3021	290-1236-00			CAP,FXD,ELCTLT:2200UF,20%,50WVDC	1W344	SMH50VN222M22X25T2
A11C3030	290-1236-00			CAP,FXD,ELCTLT:2200UF,20%,50WVDC	1W344	SMH50VN222M22X25T2
A11C4010	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A11C4020	290-1237-00			CAP,FXD,ELCTLT:12000PF,20%,16WVDC	1W344	SME16VN123M22X40LLV
A11C4030	290-1237-00			CAP,FXD,ELCTLT:12000PF,20%,16WVDC	1W344	SME16VN123M22X40LLV
A11C5020	290-0919-00			CAP,FXD,ELCTLT:470UF,+50-20%,35V	1W344	KME35VB471M10X20LL
A11C5021	281-0814-00			CAP,FXD,CER DI:100 PF,10%,100V	04222	SA102A101KAA
A11C5030	281-0775-00			CAP,FXD,CER DI:0.1UF,20%,50V	04222	SA105E104MAA
A11C6020	290-0974-00			CAP,FXD,ELCTLT:10UF,20%,50VDC	55680	UVX1H100MAA
A11C6030	290-0974-00			CAP,FXD,ELCTLT:10UF,20%,50VDC	55680	UVX1H100MAA
A11C6040	283-0194-00			CAP,FXD,CER DI:4.7UF,20%,50V	04222	SR505E475MAA
A11CR3010	152-0141-02			DIODE,SIG:,ULTRA FAST:40V,150MA,4NS,2PF	27014	FDH9427
A11CR3011	152-0141-02			DIODE,SIG:,ULTRA FAST:40V,150MA,4NS,2PF	27014	FDH9427
A11CR3040	152-0686-00			SEMICOND DVC,DI:RECT,SI,100V,5A,A264	04713	MR821
A11CR4010	152-0141-02			DIODE,SIG:,ULTRA FAST:40V,150MA,4NS,2PF	27014	FDH9427
A11CR4020	152-0066-00			DIODE,RECT:.,400V,1A,IFSM = 30A;GP10G,D0-41	25403	1N5060
A11CR4040	152-0686-00			SEMICOND DVC,DI:RECT,SI,100V,5A,A264	04713	MR821
A11CR4050	152-0686-00			SEMICOND DVC,DI:RECT,SI,100V,5A,A264	04713	MR821
A11CR4051	152-0686-00			SEMICOND DVC,DI:RECT,SI,100V,5A,A264	04713	MR821
A11CR5030	152-0066-00			DIODE,RECT:.,400V,1A,IFSM = 30A;GP10G,D0-41	25403	1N5060
A11CR5031	152-0066-00			DIODE,RECT:.,400V,1A,IFSM = 30A;GP10G,D0-41	25403	1N5060
A11CR5032	152-0066-00			DIODE,RECT:.,400V,1A,IFSM = 30A;GP10G,D0-41	25403	1N5060
A11CR5033	152-0141-02			DIODE,SIG:,ULTRA FAST:40V,150MA,4NS,2PF	27014	FDH9427
A11CR5034	152-0141-02			DIODE,SIG:,ULTRA FAST:40V,150MA,4NS,2PF	27014	FDH9427
A11CR5040	152-0141-02			DIODE,SIG:,ULTRA FAST:40V,150MA,4NS,2PF	27014	FDH9427
A11CR5041	152-0141-02			DIODE,SIG:,ULTRA FAST:40V,150MA,4NS,2PF	27014	FDH9427
A11CR5042	152-0141-02			DIODE,SIG:,ULTRA FAST:40V,150MA,4NS,2PF	27014	FDH9427
A11CR5043	152-0141-02			DIODE,SIG:,ULTRA FAST:40V,150MA,4NS,2PF	27014	FDH9427
A11F5010	159-0022-00			FUSE,CARTRIDGE:3AG,1A,250V,FAST BLOWSAFETY	71400	AGC-1
A11J1020	131-2427-01			TERM,QIK DISC.:PCB,;MALE TAB,0.250 X 0.032	00779	62650-1
A11J1030	131-2427-01			TERM,QIK DISC.:PCB,;MALE TAB,0.250 X 0.032	00779	62650-1
A11J1031	131-2427-01			TERM,QIK DISC.:PCB,;MALE TAB,0.250 X 0.032	00779	62650-1
A11J1040	131-2427-01			TERM,QIK DISC.:PCB,;MALE TAB,0.250 X 0.032	00779	62650-1
A11J3050	131-2576-00	B010100	B011090	CONN,HDR PWR:PCB,;MALE,STR,1 X 6,0.156 CTR	26742	3109-11-206-01
A11J3050	131-5311-00	B011091		CONN,HDR PWR:PCB,;MALE,STR,1 X 7,0.156 CTR	27264	26-61-4070

# Replaceable Electrical Parts—TM 5006A

Component No.	Tektronix Part Number	Serial Number Effect Discont	Part Name & Description	Mfr Code	Mfr Part Number
A11J4010	131-0608-00		TERMINAL, PIN: PRESSFIT/PCB, ; MALE, STR, 0.025 (QTY 3 EA)	22526	48283-036
A11J4060	131-3074-00		CONN, HDR: PCB, ; MALE, STR, 2 X 10, 0.1 CTR, 0.318	22526	65805-120
A11J4061	131-3514-00		CONN, RIBBON: PCB, ; FEMALE, RTANG, 24 POS, 0.085	22526	68277-001
A11L3020	108-1022-00		COIL, RF: FIXED, 8.85UH	0JRO3	108-1022-00
A11L3030	108-1022-00		COIL, RF: FIXED, 8.85UH	0JRO3	108-1022-00
A11L3040	108-0950-00		COIL, RF: FIXED, 5.5UH	0JRO3	108-0950-0
A11O1010	151-0736-00		TRANSISTOR, SIG: BIPOLAR, NPN; 40V, 600MA, 250MHZ	04713	2N4401
A11O1020	151-0190-00		TRANSISTOR, SIG: BIPOLAR, NPN; 40V, 200MA, 300MHZ	04713	2N3904
A11O6030	151-0190-00		TRANSISTOR, SIG: BIPOLAR, NPN; 40V, 200MA, 300MHZ	04713	2N3904
A11R1010	311-2273-00		RES, VAR, NONWW: TRMR, 2K OHM, 20%, 0.5W LINEAR	TK2073	GF06VT2 202 M L20
A11R1011	311-2257-00		RES, VAR, NONWW: TRMR, 500 OHM, 20%, 0.5W LINEAR	32997	3362-M-1-501R
A11R1012	301-0100-00		RES, FXD, FILM: 10 OHM, 5%, 0.50W	19701	SFR30 2322-180-13100
A11R1013	315-0103-00		RES, FXD, FILM: 10K OHM, 5%, 0.25W	19701	5043CX10K00J
A11R1014	315-0512-00		RES, FXD, FILM: 5.1K OHM, 5%, 0.25W	57668	NTR25J-E05K1
A11R1015	321-0293-00		RES, FXD, FILM: 11.0K OHM, 1%, 0.125W, TC=TOMI	91637	CMF55116G11001F
A11R1020	315-0104-00		RES, FXD, FILM: 100K OHM, 5%, 0.25W	57668	NTR25J-E100K
A11R1021	315-0104-00		RES, FXD, FILM: 100K OHM, 5%, 0.25W	57668	NTR25J-E100K
A11R1022	321-0249-00		RES, FXD, FILM: 3.83K OHM, 1%, 0.125W	91637	CMF55116G38300F
A11R1023	315-0104-00		RES, FXD, FILM: 100K OHM, 5%, 0.25W	57668	NTR25J-E100K
A11R1024	315-0913-00		RES, FXD, FILM: 91K OHM, 5%, 0.25W	19701	5043CX91K00J
A11R1030	301-0100-00		RES, FXD, FILM: 10 OHM, 5%, 0.50W	19701	SFR30 2322-180-13100
A11R1040	321-0225-00		RES, FXD, FILM: 2.15K OHM, 1%, 0.125W	91637	CMF55116G21500F
A11R2010	321-0338-00		RES, FXD, FILM: 32.4K OHM, 1%, 0.125W	91637	CMF55116G32401F
A11R3010	315-0104-00		RES, FXD, FILM: 100K OHM, 5%, 0.25W	57668	NTR25J-E100K
A11R3011	315-0751-00		RES, FXD, FILM: 750 OHM, 5%, 0.25W	57668	NTR25J-E750E
A11R3012	315-0513-00		RES, FXD, FILM: 51K OHM, 5%, 0.25W	57668	NTR25J-E51K0
A11R3013	315-0682-00		RES, FXD, FILM: 6.8K OHM, 5%, 0.25W	57668	NTR25J-E06K8
A11R3014	315-0242-00		RES, FXD, FILM: 2.4K OHM, 5%, 0.25W	57668	NTR25J-E02K4
A11R3015	315-0203-00		RES, FXD, FILM: 20K OHM, 5%, 0.25W	57668	NTR25J-E 20K
A11R3016	315-0153-00		RES, FXD, FILM: 15K OHM, 5%, 0.25W	19701	5043CX15K00J
A11R3017	321-0164-00		RES, FXD, FILM: 499 OHM, 1%, 0.125W, TC=TO	91637	CMF55116G4990F
A11R3019	315-0223-00		RES, FXD, FILM: 22K OHM, 5%, 0.25W	19701	5043CX22K00J92U
A11R4010	315-0223-00		RES, FXD, FILM: 22K OHM, 5%, 0.25W	19701	5043CX22K00J92U
A11R4011	315-0103-00		RES, FXD, FILM: 10K OHM, 5%, 0.25W	19701	5043CX10K00J
A11R4012	315-0751-00		RES, FXD, FILM: 750 OHM, 5%, 0.25W	57668	NTR25J-E750E
A11R4013	315-0224-00		RES, FXD, FILM: 220K OHM, 5%, 0.25W	57668	NTR25J-E220K
A11R4014	315-0623-00		RES, FXD, FILM: 62K OHM, 5%, 0.25W	19701	5043CX62K00J
A11R4015	315-0223-00		RES, FXD, FILM: 22K OHM, 5%, 0.25W	19701	5043CX22K00J92U
A11R4016	315-0130-00		RES, FXD, FILM: 13 OHM, 5%, 0.25W	01121	CB1305
A11R4017	315-0103-00		RES, FXD, FILM: 10K OHM, 5%, 0.25W	19701	5043CX10K00J
A11R4018	315-0302-00		RES, FXD, FILM: 3K OHM, 5%, 0.25W	57668	NTR25J-E03K0
A11R4019	315-0134-00		RES, FXD, FILM: 130K OHM, 5%	57668	NTR25J-E130K
A11R4020	315-0821-00		RES, FXD, FILM: 820 OHM, 5%, 0.25W	19701	5043CX820R0J
A11R4021	321-0279-00		RES, FXD, FILM: 7.87K OHM, 1%, 0.125W, TC=TOMI	91637	CMF55116G78700F
A11R4040	308-0426-00		RES, FXD, WW: 470 OHM, 5%, 3W	91637	CW2B-470R0J T/R
A11R4050	308-0426-00		RES, FXD, WW: 470 OHM, 5%, 3W	91637	CW2B-470R0J T/R
A11R5020	315-0332-00		RES, FXD, FILM: 3.3K OHM, 5%, 0.25W	57668	NTR25J-E03K3
A11R5021	321-0279-00		RES, FXD, FILM: 7.87K OHM, 1%, 0.125W, TC=TOMI	91637	CMF55116G78700F
A11R5022	321-0241-00		RES, FXD, FILM: 3.16K OHM, 1%, 0.125W, TC=TOMI	91637	CMF55116G31600F
A11R5023	315-0130-00		RES, FXD, FILM: 13 OHM, 5%, 0.25W	01121	CB1305
A11R5024	315-0130-00		RES, FXD, FILM: 13 OHM, 5%, 0.25W	01121	CB1305
A11R5030	321-0225-00		RES, FXD, FILM: 2.15K OHM, 1%, 0.125W	91637	CMF55116G21500F
A11R5031	321-0322-00		RES, FXD, FILM: 22.1K OHM, 1%, 0.125W, TC=TO, MI	91637	CMF55116G22101F
A11R5032	321-0279-00		RES, FXD, FILM: 7.87K OHM, 1%, 0.125W, TC=TOMI	91637	CMF55116G78700F



Component No.	Tektronix Part Number	Serial Number Effect      Discont	Part Name & Description	Mfr Code	Mfr Part Number
A11R5033	321-0279-00		RES,FXD,FILM:7.87K OHM,1%,0.125W,TC=T0MI	91637	CMF55116G78700F
A11R5040	308-0426-00		RES,FXD,WW:470 OHM,5%,3W	91637	CW2B-470R0J T/R
A11R5050	308-0426-00		RES,FXD,WW:470 OHM,5%,3W	91637	CW2B-470R0J T/R
A11R5051	308-0402-00		RES,FXD,WW:30 OHM,5%,5W	91637	CW2A-K30R00J T/R
A11R5052	323-0095-00		RES,FXD,FILM:95.3 OHM,1%,0.5W	91637	CMF65116G95R30F
A11T2050	120-1299-00		XFMR,PWR,STPDN:HF	75498	120-1299-00
A11T3060	120-1844-00		XFMR,TOROID:CURRENT	OJR03	ORDER BY DISCRIPTION
A11TP1030	131-0608-00		TERMINAL,PIN:PRESSFIT/PCB,;MALE,STR,0.025	22526	48283-036
A11TP1031	131-0608-00		TERMINAL,PIN:PRESSFIT/PCB,;MALE,STR,0.025	22526	48283-036
A11TP1040	131-0608-00		TERMINAL,PIN:PRESSFIT/PCB,;MALE,STR,0.025	22526	48283-036
A11TP1041	131-0608-00		TERMINAL,PIN:PRESSFIT/PCB,;MALE,STR,0.025	22526	48283-036
A11TP6040	131-0608-00		TERMINAL,PIN:PRESSFIT/PCB,;MALE,STR,0.025	22526	48283-036
A11U2010	156-0411-00		IC,LINEAR:BIPOLAR,COMPARATOR:QUAD,SINGLE	04713	LM339N
A11U2020	156-2024-00		IC,LINEAR:BIPOLAR,SW-REGULATOR CONTROLLER	12969	UC3525AN
A11U6020	156-0071-00		IC,LINEAR:BIPOLAR,VOLTAGE REGULATOR	27014	LM723CN
A11VR4010	152-0236-00		DIODE,ZENER:12.5V,4%,0.4W,	14552	TD333881

# Replaceable Electrical Parts-TM 5006A

Component No.	Tektronix Part Number	Serial Effect	Number Discont	Part Name & Description	Mfr Code	Mfr Part Number
A12	671-1382-00	B010100	B011090	CIRCUIT BD ASSY:CONVERTOR	80009	671-1382-00
A12	671-1382-01	B011091	B01152	CIRCUIT BD ASSY:CONVERTOR	80009	671-1382-01
A12	671-1382-02	B011593		CIRCUIT BD ASSY:CONVERTOR	80009	671-1382-02
A12C1020	283-0008-00			CAP,FXD,CER DI:0.1UF,20%,500V	04222	SR507C104MAA
A12C1021	283-0008-00			CAP,FXD,CER DI:0.1UF,20%,500V	04222	SR507C104MAA
A12C1030	290-1203-00			CAP,FXD,ELCTL:1200UF,20%,200V	24165	80D2361
A12C1040	290-1203-00			CAP,FXD,ELCTL:1200UF,20%,200V	24165	80D2361
A12C1050	283-0008-00			CAP,FXD,CER DI:0.1UF,20%,500V	04222	SR507C104MAA
A12C1071	283-0008-00			CAP,FXD,CER DI:0.1UF,20%,500V	04222	SR507C104MAA
A12C2011	283-0008-00			CAP,FXD,CER DI:0.1UF,20%,500V	04222	SR507C104MAA
A12C2013	283-0008-00			CAP,FXD,CER DI:0.1UF,20%,500V	04222	SR507C104MAA
A12C2052	283-0029-00			CAP,FXD,CER DI:0.005UF,5%,500V	59660	821-000B502J
A12C2054	283-0029-00			CAP,FXD,CER DI:0.005UF,5%,500V	59660	821-000B502J
A12C3012	285-1218-00	B010100	B011090	CAP,FXD,PLASTIC:0.27UF,10%,400VDC	84411	ADVISE
A12C3012	285-1465-00	B011091		CAP,FXD,PAPER:METALIZED PAPER,CLASS X	TK0515	PME271M627K
A12C3052	285-1192-00			CAP,FXD,PPR DI:0.0022 UF,20%,250VAC	TK0515	PME271Y422
A12C3053	285-1192-00			CAP,FXD,PPR DI:0.0022 UF,20%,250VAC	TK0515	PME271Y422
A12C4060	285-1325-00			CAP,FXD,MTLZD:1UF,10%,400VDC	TK0515	PMR27.5 105 K 400
A12C4062	283-0000-00			CAP,FXD,CER DI:0.001UF,+100-0%,500V	51406	DD06450Y5U102P500V
A12C4070	283-0044-00			CAP,FXD,CER DI:1000PF,20%,3000V	58421	ORDER BY DESCRIPTION
A12C4071	285-1205-00			CAP,FXD,MTLZD:0.06UF,5%,1000V	84411	TEK 210 .06 5 1,000
A12C5011	283-0358-00	B010100	B011090	CAP,FXD,CER DI:0.01UF,-20 +80%,1.4KVUL	60705	440LS10
A12C5011	285-1464-00	B011091		CAP,FXD,PAPER:METALIZED PAPER,CLASS Y	TK0515	PME271Y510MS
A12C5020	283-0358-00	B010100	B011090	CAP,FXD,CER DI:0.01UF,-20 +80%,1.4KVUL	60705	440LS10
A12C5020	285-1464-00	B011091		CAP,FXD,PAPER:METALIZED PAPER,CLASS Y	TK0515	PME271Y510MS
A12C5070	283-0000-00			CAP,FXD,CER DI:0.001UF,+100-0%,500V	51406	DD06450Y5U102P500V
A12CR2010	152-0750-00			DIODE,RECT:,FAST RCVRY:BRIDGE,600V,3A	6L334	PB66F-BS01-S
A12CR3082	152-0655-00			SEMICON DVC,DI:RECT,SI,100V,3A	13409	SEN-R-246
A12CR3083	152-0400-00			DIODE,RECT:,FAST RCVRY:400V,1A,200NS;1N4936	25403	1N4936
A12CR3084	152-0400-00			DIODE,RECT:,FAST RCVRY:400V,1A,200NS;1N4936	25403	1N4936
A12CR3085	152-0655-00			SEMICON DVC,DI:RECT,SI,100V,3A	13409	SEN-R-246
A12DS1052	150-0030-00			LAMP,GLOW:60-90V MAX,0.6MA,A28-T,WIRE LEADS	0J9R2	NE-2B(AC/DC)-R-T
A12E3013	119-0181-00			ARSR,ELEC SURGE:230,GAS FILLED,+/-15%	25088	B1-A230T
A12E4012	119-0181-00			ARSR,ELEC SURGE:230,GAS FILLED,+/-15%	25088	B1-A230T
A12J4013	131-3258-00	B010100	B011090	CONN,HDR PWR:PCB,:MALE,STR,1 X 2,0.156 CTR	26742	3107-11-202-01
A12J4013	131-5313-00	B011091		CONN,HDR PWR:PCB,:MALE,STR,1 X 2,0.156 CTR	27264	26-61-4020
A12J4014	131-2992-00	B010100	B011090	CONN,HDR PWR:PCB,:MALE,STR,1 X 3,0.156 CTR	26742	3107-11-103-01
A12J4014	131-5312-00	B011091		CONN,HDR,PWR:PCB,MALE,STR,1 X 5,0.156 CTR	27264	26-61-4050
A12J4015	131-2992-00	B010100	B011090	CONN,HDR PWR:PCB,:MALE,STR,1 X 3,0.156 CTR	26742	3107-11-103-01
A12J4015	131-5312-00	B011091		CONN,HDR,PWR:PCB,MALE,STR,1 X 5,0.156 CTR	27264	26-61-4050
A12J4016	174-0177-00			CABLE ASSY,PWR,:2.18 AWG,125V,7.25	70903	ORDER BY DESCRIPTION
A12J5010	131-2427-01			TERM,QIK DISC.:PCB,:MALE TAB,0.250 X 0.032	00779	62650-1
A12J5080	131-2576-00	B010100	B011090	CONN,HDR PWR:PCB,:MALE,STR,1 X 6,0.156 CTR	26742	3109-11-206-01
A12J5080	131-5311-00	B011091		CONN,HDR PWR:PCB,:MALE,STR,1 X 7,0.156 CTR	27264	26-61-4070
A12L2060	108-1492-00			COIL,RF:FXD,1MH,POT CORE	54937	500-4688
A12L3011	108-1037-00			COIL,RF:FXD,500UH	0JR03	108-1037-00
A12L3050	108-0972-00			COIL,RF:FIXED,500UH	0JR03	108-0972-00
A12L3051	108-0972-00			COIL,RF:FIXED,500UH	0JR03	108-0972-00
A12LR2050	108-0537-00			COIL,RF:FIXED,200UH	0JR03	108-0537-00
A12LR2053	108-0537-00			COIL,RF:FIXED,200UH	0JR03	108-0537-00
A12R1010	308-0767-00			RES,FXD:1.1 OHM,5%,1W	75042	SP-20-1.1 OHM -5%
A12R1011	308-0767-00			RES,FXD:1.1 OHM,5%,1W	75042	SP-20-1.1 OHM -5%
A12R1051	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A12R1060	303-0104-00			RES,FXD,CMPSPN:100K OHM,5%,1W	91637	CMF65-42 100 K OHM 5

Component No.	Tektronix Part Number	Serial Number Effect	Discont	Part Name & Description	Mfr Code	Mfr Part Number
A12R1061	303-0104-00			RES,FXD,CMPSN:100K OHM,5%,1W	91637	CMF65-42 100 K OHM 5
A12R1070	301-0685-00			RES,FXD,FILM:6.8M OHM,5%,0.5W	01121	EB6855
A12R2012	308-0767-00			RES,FXD:1.1 OHM,5%,1W	75042	SP-20-1.1 OHM -5%
A12R2020	308-0767-00			RES,FXD:1.1 OHM,5%,1W	75042	SP-20-1.1 OHM -5%
A12R2040	315-0471-00			RES,FXD,FILM:470 OHM,5%,0.25W	57668	NTR25J-E470E
A12R2081	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10R00J
A12R2082	315-0431-00			RES,FXD,FILM:430 OHM,5%,0.25W	19701	5043CX430R0J
A12R3010	315-0361-00			RES,FXD,FILM:360 OHM,5%,0.25W	19701	5043CX360R0J
A12R3070	308-0426-00			RES,FXD,W:470 OHM,5%,3W	91637	CW2B-470R0J T/R
A12R3080	315-0100-00			RES,FXD,FILM:10 OHM,5%,0.25W	19701	5043CX10R00J
A12R3081	315-0431-00			RES,FXD,FILM:430 OHM,5%,0.25W	19701	5043CX430R0J
A12R4061	315-0101-00			RES,FXD,FILM:100 OHM,5%,0.25W	57668	NTR25J-E 100E
A12R4072	305-0470-00			RES,FXD,CMPSN:47 OHM,5%,2W	01121	HB 4705
A12R5071	301-0331-00			RES,FXD,FILM:330 OHM,5%,0.5W	19701	5053CX330R0J
A12RT4010	307-0350-00			RES,THERMAL:7.5 OHM,10%,3.9%/DEG C	15454	750J7R5K-R0-220-SIL-
A12RT4011	307-0350-00			RES,THERMAL:7.5 OHM,10%,3.9%/DEG C	15454	750J7R5K-R0-220-SIL-
A12T2080	120-1655-00			TRANSFORMER,PWR:GATE DR,1:1:1,1.5MH	24165	96Z4600JEE
A12T4050	120-1734-00			TRANSFORMER,RF:COMMON MODE,4MH,4ADC	TK1601	PE-62916
B500	119-0147-00			FAN,VENTILATING:115VAC,14W,50-60HZ,105 CFM (OPTION 10 ONLY)	82877	028021
B500	119-0721-00			FAN,TUBEAXIAL:115 VAC, 10W,50-60 HZ,80 CFM (STANDARD OPT 02,12,15)	82877	WR2H1
CR1050	152-1118-00	B010100	B011004	SEMICONDC DVC,DI:RECT,SI,30A,45V	04713	MBR3045PT
CR1050	152-1118-01	B011005		DIODE,RECT:SCHTKY, :45V,30A,COM-CATH	04713	MBR3045PT
F500	159-0013-00			FUSE,CARTRIDGE:3AG,6A,250V,FAST BLOW (STANDARD OPT 02,10,12,15)	75915	312006
F500	159-0017-00			FUSE,CARTRIDGE:3AG,4A,250V,FAST BLOW (OPTIONS A1,A2,A3,A4,A5 ONLY)	71400	AGC-4
FL500	119-3212-00			SELECTOR,LINE V:W/LINE FILTER,RCPT & FUHLR (STANDARD OPT 02,10, & 12)	91636	PE60FS06
FL600	119-3634-00			FILTER,RFI:6A,120VAC,50-60HZ (OPTION 15 ONLY)	05245	6EQ1
Q450	151-0652-00			TRANSISTOR,PWR:BIPOLAR,NPN:100V,25A,3.0MHZ	04713	TIP35C
Q650	151-0651-00			TRANSISTOR,PWR:BIPOLAR,PNP:100V,25A,3.0MHZ	04713	TIP36C
Q3011	151-0938-00			TRANSISTOR,PWR:BIPOLAR,PNP:90V,10A,2.5 MHZ	04713	MJF2955
Q3017	151-0937-00			TRANSISTOR,PWR:BIPOLAR,NPN:90V,10A,2.5 MHZ	04713	MJF3055
Q3025	151-0938-00			TRANSISTOR,PWR:BIPOLAR,PNP:90V,10A,2.5 MHZ	04713	MJF2955
Q3029	151-0937-00			TRANSISTOR,PWR:BIPOLAR,NPN:90V,10A,2.5 MHZ	04713	MJF3055
Q3036	151-0938-00			TRANSISTOR,PWR:BIPOLAR,PNP:90V,10A,2.5 MHZ	04713	MJF2955
Q3039	151-0937-00			TRANSISTOR,PWR:BIPOLAR,NPN:90V,10A,2.5 MHZ	04713	MJF3055
Q3051	151-0938-00			TRANSISTOR,PWR:BIPOLAR,PNP:90V,10A,2.5 MHZ	04713	MJF2955
Q3057	151-0937-00			TRANSISTOR,PWR:BIPOLAR,NPN:90V,10A,2.5 MHZ	04713	MJF3055
Q3067	151-0938-00			TRANSISTOR,PWR:BIPOLAR,PNP:90V,10A,2.5 MHZ	04713	MJF2955
Q3070	151-0937-00			TRANSISTOR,PWR:BIPOLAR,NPN:90V,10A,2.5 MHZ	04713	MJF3055
Q3086	151-1195-00			TRANSISTOR,PWR:MOS,N-CH:500V,8.0A,0.85 OHM	04713	MTP8N50E
Q3087	151-1195-00			TRANSISTOR,PWR:MOS,N-CH:500V,8.0A,0.85 OHM	04713	MTP8N50E
S500	260-1961-00			SWITCH,ROCKER:DPST,6(4)A,250V	7W718	1802-1121
S600	260-1710-00			SWITCH,THRMSTC:NC,OPEN 92.97,CL 80.4,10A	14604	2450-47-16
S650	260-0907-00			SWITCH,THRMSTC:NC,OPEN 97.8,CL 75.6	TK2292	430-349
T500	120-1845-00	B010100	B011090	XFMR,PWR,STPDN:PRI 100/220VAC W/TAPS,60HZ	75498	128-9032-EE
T500	120-1845-01	B011091	B012033	TRANSFORMER,PWR:PRIM TAPPED 100/120/220/240	75498	128-9032-EE
T500	120-1845-02	B011034		TRANSFORMER,PWR:PRIM TAPPED 100/120/220/240	75498	128-9032-EE

# Replaceable Electrical Parts—TM 5006A

Component No.	Tektronix Part Number	Serial Effect	Number Discont	Part Name & Description	Mfr Code	Mfr Part Number
W200	174-2006-00			CA ASSY,SP,ELEC:6,22 AWG,7.5 L	80009	174-2006-00
W300	174-1287-00			CA ASSY,SP,ELEC:4,18 AWG,8-N,24.0 L (STANDARD OPTION 02,10,12)	80009	174-1287-00
W300	174-2003-00			CA ASSY,SP,ELEC:MULTI COND,24.0 L,W/FAST (OPTION 15 ONLY)	80009	174-2003-00
W310	196-3298-00			LEAD,ELECTRICAL:18 AWG,21.0 L (OPTION 15 ONLY)	80009	196-3298-00
W312	196-3296-00			LEAD,ELECTRICAL:18 AWG,7.50 L (OPTION 15 ONLY)	80009	196-3296-00
W314	174-2004-00	B010100	B011090	CA ASSY,SP,ELEC:2,18 AWG,3.63 L	80009	174-2004-00
W314	174-2004-01	B011091		CA ASSY,SP,ELEC:2,18 AWG,3.63 L	80009	174-2004-01
W315	174-2005-00	B010100	B011090	CA ASSY,SP,ELEC:3,18 AWG,6.5 L	80009	174-2005-00
W315	174-2005-01	B011091		CA ASSY,SP,ELEC:3,18 AWG,6.5 L	80009	174-2005-01
W400	175-5970-01			CA ASSY,SP,ELEC:3,26 AWG,5.12 L,RIBBON	80009	175-5970-01
W410	196-3220-00			LEAD,ELECTRICAL:18 AWG,2.5 L,5-4	0J7N9	196-3220-00
W450	198-5712-00			WIRE SET,ELEC:4 WIRE W/QUICK DISC,FERRITE	80009	198-5712-00
W470	198-5711-00	B010100	B011090	WIRE SET,ELEC:4 WIRE W/1 X 6 HOLDERS	80009	198-5711-00
W470	198-5711-01	B011091		WIRE SET,ELEC:4 WIRE W/1 X 6 HOLDERS	80009	198-5711-01
W500	174-2011-00			CA ASSY,SP,ELEC:20 COND,23.4 L	80009	174-2011-00
W4050	195-0947-00			LEAD,ELECTRICAL:22 AWG,1.5 L	TK1997	ORDER BY DESCRIPTION